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IN THE UNITED STATES PATENT AND
TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of;

Mark Rasper et al.

Serial No. 09/222,282

Filed: 12/29/99

Examiner: K. Tran

Art Unit: 3724

Supervisory Examiner: Rinaldi Rada

For: KNIFE INDEXING APPARATUS

APPEAL BRIEF

On August 14, 2000, appellants appealed from the final rejection of their claim 1, claim 2 having been withdrawn from consideration pursuant to a restriction requirement. What follows is appellant's appeal brief as required by 37 CFR 1.192(a).

09/27/2000 CV0111 00000059 09222282

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REAL PARTY OF INTEREST

The real party of interest in this application is the assignee:

Productive Solutions Inc.
P.O. Box 618
1035 Breezewood Lane
Neenah WI 54957

RELATED APPEALS

There are no related appeals known to the appellant, his counsel or the assignee which will effect, or be effected by or have a bearing on the boards decisions in the pending appeal.

STATUS OF CLAIMS

On 12/28/98 Claims 1 and 2 were filed in the above described patent application. On 12/22/99, an office action requiring election/restriction was mailed. On 01/04/00 the applicant's election of claim 1 was made and claim 2 was withdrawn from consideration. On 02/10/00 an office action rejecting claim 1 under 35 USC 103 was mailed. On 03/08/00, a response to the office action of 02/19/00 was received in the PTO. On 05/09/00, an office action repeating the 35 USC 103 rejection of claim 1 was made FINAL. This is an appeal of that rejection.

STATUS OF AMENDMENTS

No amendments have been made in this application. The applicant has withdrawn claim 2 by election and the appellants response of 03/08/00 is a challenge of the availability of Bailey as a 35 USC 103 reference.

SUMMARY OF THE INVENTION

The invention is for a knife indexing apparatus for a non-rotating core cutting knife and a means for automatically indexing the knife during core cutting operations. The apparatus employs the discovery that by indexing the knife in the direction of rotation of the core, at least one additional fresh cutting edge can be presented to the work than would be the case if the knife were rotated in the direction opposite to the direction of rotation of the core to be cut. The invention also employs a worm and worm gear to eliminate lash and other indexing variabilities that have been present in prior art devices.

ISSUES

The appellant presents hereinafter three issues:

ISSUE #1

Was the examiner's finding improper and in error in determining that Bailey was available as prior art under 35 USC 103 to one skilled in the art at the time the invention was made? The

applicant will argue that the examiner's 35 USC 103 rejection citing Bailey was improper and his conclusions based thereon were in error.

ISSUE #2

Are the examiner's arguments based on 35 U.S.C. 102 practice sound and well taken? The appellant will argue that they are not.

ISSUE #3

Would Bailey taken in view of Cavalli have rendered the claimed invention obvious to one skilled in the art at the time the invention was made? The appellant will argue that they would not.

GROUPING OF CLAIMS

There is only one claim pending in the application and no grouping is needed.

ARGUMENTS

The applicant regrets that he was denied a right to present the following arguments to the examining group. He apologizes to the board for bringing before them issues that could have been resolved between the appellant and the examining group.

The Appendix attached hereto contains a chronology of critical events, the correspondence record of the subject patent

application and relevant documents and authorities relied upon by the applicant in making his arguments in support of his request for a reversal of the 35 U.S.C. 103 rejection of his claim 1.

Issue #1, raises the question of whether or not the contents of Bailey were available to one skilled in the art at the time the invention was made.

The facts are these:

1) The subject patent application (exhibit #2B) was filed on 12/28/98 and claimed the benefits of a previously filed Provisional Patent Application (exhibit #2A,), filed 01/05/98, (see exhibit #2B, page 1, the first paragraph).

2) Bailey, U.S.5,761,976, (exhibit #3A) issued on 06/09/98.

3) In the office action of 02/10/00 (exhibit 2E), examiner Tran rejects applicants claim 1 as follows:

"4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey in view of Cavalli, Bailey discloses the invention substantially as claimed except for the use of worm gears and shaft. However, Cavalli teaches the use of such features as a mechanism to automatically rotate a cutting tool (reference column 2,lines 9-16). In view of Cavalli, it would have been obvious to one having skill in the art to provide Bailey's device with a worm gear to rotate a cutting tool since a worm gear mechanism is well-known in the art and can easily be utilized."

4) 35 U.S.C. 103 is reproduced as item 3 of exhibit #2E.

The appellants arguments for reversal of the examiner's decisions are as follows;

The filing of a provisional application disclosing the claimed invention and containing a declaration sufficient to meet the requirements of 35 U.S.C. 1.131, establishes the appellants date of invention for 35 U.S.C. 103 considerations as 01/05/98. The disclosures of Bailey were a part of a pending patent application at that time and not available to one skilled in the art at the time the invention was made. Therefore, Bailey can not serve to render the claimed invention obvious to one skilled in the art at the time the invention was made.

The appellant respectfully submits that the examiner erred in citing Bailey as his primary reference in making his 35 U.S.C.103 rejection of applicants claim 1 and the appellant respectfully requests that the board so find.

Issue #2, raises the question of whether or not the contents of pending patent applications are available as 35 U.S.C.103 prior art as of their filing date.

The facts are these.

- 1) The applicant's response of 03/08/00 (exhibit #2F) to the office action of 02/10/00 (exhibit #2E) was a bonafide attempt to

establish the status of examiner Tran's primary reference, Bailey, as a 35 U.S.C.103 reference.

- 2) The office action of 05/09/00 (exhibit #2G) repeats the rejection of 02/10/00 and makes the rejection FINAL.
- 3) The examiner presents arguments based on 35 U.S.C. 102 practice in supporting his claim that Bailey is a proper 35 U.S.C. 103 reference as follows;

"3 Applicant's arguments have been fully considered but they are not persuasive.

Applicant contends that Bailey was not available as a 35 USC 103(a) reference at the time of the invention because Bailey, U.S. Patent No 5,761,976 was issued 6/9/98 while applicant's invention claims priority of the Provisional Patent Application 60/070,405 filed on 1/5/98. However, had Bailey been cited as a rejection under 35 U.S.C. 102, it would have qualified as a 35 U.S.C. 102 (e) which is reliant on the filing date. Therefore, Bailey as a 35 U.S.C. 103 (a) reference is deemed proper."

- 4) Bailey is not a 35 U.S.C. 102 anticipatory reference as the examiner acknowledges in his initial 35 U.S.C. 103 rejection cited above. That is, Bailey lacks at least one critical and essential element of appellant's claim 1 which is a worm and worm gear indexing drive means. Other critical and essential elements of appellant's claim 1 and not found in Bailey will be presented in issue #3 below.

5) Examiner Tran's suppositions are based on a hypothetical 35 U.S.C. 102 status of appellants claim 1 which have no basis in fact.

6) Examiner Tran's finding that a 35 U.S.C. 103 reference is available to one skilled in the art as prior art as of its filing date for the purposes of determining 35 U.S.C. 103 obviousness is unsupported by citations of law or rule or legal precedent.

7) Examiner Trans making of the action of 05/09/00 FINAL places the applicant in a position where he no longer has a right to submit 35 U.S.C. 1.131 exhibits and an affidavit swearing behind Bailey's filing date. Exhibit #4A is a hand written notebook page showing the appellant's had the concept for the invention of claim 1 prior to Bailey's filing date and Exhibit #4B is a FAX which is one of a number that would show diligence in reducing the invention to practice.

The appellant's arguments for reversal of the examiners decisions are as follows;

The appellant submits that there is no 35 U.S.C. 102 question present in the examiner's 35 U.S.C.103 rejection of appellant's claim 1. He further submits that Examiner Tran's introduction of 35 U.S.C. 102 parameters into his rejection of claim 1 is hypothetical, and without foundation in fact, it is specious and without support in rule or law.

The appellants respectfully submit that Examiner Tran's finding that the contents of pending patent applications are available to

one skilled in the art for determining obviousness under 35 U.S.C. 103 is improper and in error. Reversal of examiner's decision in the office action of 05/09/00 that Bailey as a 35 U.S.C. 103 reference is deemed proper, is requested.

Issue #3, involves the question of the capacity of Bailey taken in view of Cavalli to render appellant's claim 1 obvious under 35 U.S.C. 103.

The facts are:

1) The appellant's claim 1 stands twice rejected and FINALLY rejected.

2) The office action of 05/09/00 repeats the 35 U.S.C. 103(a) rejection of the previous office action as follows.

"2. Claim 1 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Bailey in view of Cavalli as set forth in the previous office action."

3) The previous office action making the 35 U.S.C 103(a) rejection of appellant's claim 1 reads as follows;

"4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey in view of Cavalli, Bailey discloses the invention substantially as claimed except for the use of worm gears and shaft. However, Cavalli teaches the use of such features as a mechanism to automatically rotate a cutting tool

(reference column 2, lines 9-16). In view of Cavalli, it would have been obvious to one having skill in the art to provide Bailey's device with a worm gear to rotate a cutting tool since a worm gear mechanism is well-known in the art and can easily be utilized."

The appellant's arguments for reversal of the examiner's 35 U.S.C. 103 rejection of their claim 1 are as follows;

The appellant submits that the making FINAL of the office action of 05/09/00 was premature and foreclosed the applicant's right to have the following arguments entered into his application file.

If Bailey is sustained as a 35 U.S.C. 103 reference, then the appellants will argue that Bailey and Cavalli both lack at least 2 essential and critical elements disclosed by the appellants and claimed in their claim 1 and therefore could not, when taken together render these elements obvious to one skilled in the art.

- 1) Neither Bailey nor Cavalli disclose a worm and worm gear as a means for accurately indexing a non-rotating cutting tool as claimed in claim 1 subparagraphs d and e and in the specifications on page 8 the last full paragraph.

The examiner's assertion that it would have been obvious to one skilled in the art to provide Bailey with a worm and worm gear to rotate a cutting tool is a hindsight fabrication without foundation or merit. The device of Cavalli advances a rotating cutting tool into the workpiece and no indexing is

taught or claimed (See Exhibit 3B, the abstract and the preamble of claims 1-5).

Further, Cavalli is not from the core cutting or an analogous art.

Further the examiner's allegations that; "However, Cavalli teaches the use of such features as a mechanism to automatically rotate a cutting tool (reference column 2,lines 9-16)", is specious. The paragraph referenced does not contain the words, "automatically", "rotate", nor "cutting tool". When read in the context of Cavalli, there is nothing in the paragraph referenced by the examiner to motivate one skilled in the art to apply the teachings of Cavalli to the indexing of a non-rotating cutting tool in the core cutting art as taught and claimed by the appellants.

Further, the examiners assertions that; "In view of Cavalli, it would have been obvious to one having skill in the art to provide Bailey's device with a worm gear to rotate a cutting tool since a worm gear mechanism is well-known in the art and can easily be utilized." is without support in Bailey or Cavalli and the "well-known" mechanism of a worm and worm gear is not found in either Bailey or Cavalli. A worm gear and worm as a means for accurately indexing a non-roatating cutting tool is not taught or suggested by either Bailey or Cavalli

Further, there is nothing in Bailey or Cavalli that would

suggest a worm and worm gear acting in the mode taught in the specifications, the last full paragraph of page 8 and claimed in claim 1, subparagraphs d,e, and f as an accurate lash and play free mode of operation of a worm and worm gear for indexing a non-rotating cutting tool.

Further, there is nothing in Bailey or Cavalli that would motivate one skilled in the art to look in the direction of a worm gear as an accurate means for indexing a non-rotating cutting tool as taught by the appellants in their specifications, the last full paragraph of page 8 and claimed in claim 1 subparagraphs d,e, and f.

2) Neither Bailey nor Cavalli disclose any knowledge of the appellants discovery that rotating the knife in the direction of rotation of the core being cut will provide more fresh cutting surfaces per knife than would be had by rotating the knife against the direction of rotation of the core being cut as claimed by the appellants in claim 1, subparagraph g, and disclosed in the specifications, page 7, the second paragraph under DETAILED DESCRIPTION, and illustrated in appellant's figure 1.

The above cited discovery taken with the securent of the worm gear to the mandrel to virtually eliminate lash and play in the indexing means combined with the the electronic counting of cutting cycles and indexing cycles (claim 1,subparagraphs h and i, and figure 3) results in a significant improvement in indexing accuracy and cutting efficiency and a reduction

in knife costs of a core cutting knife indexing system.

Absent any teaching of the criticality of the direction of knife indexing in the prior art or any motivation for one skilled in the art to look at the direction of knife rotation as a means for improving cutting efficiency and reducing knife costs, it is submitted that applicants claim 1 claims a patentable discovery under 35 U.S.C. 103(a) the last sentence taken with 35 U.S.C. 100(a) ('The term "invention" means invention or discovery').

For the forgoing reasons, it is submitted that the examiner's rejections of claim 1 are erroneous, and reversal of his decisions is respectfully requested.

by

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APPENDIX

EXHIBITS

Exhibit #1 Chronology of Correspondence

Exhibits #2 Correspondence

Exhibit #2A Filing Receipt of Provisional Application
Exhibit #2B Application as filed
Exhibit #2C Office Action of 12/22/99 requiring restriction.
Exhibit #2D Election of Claim 1 to prosecute
Exhibit #2E Office Action of 02/10/00 rejecting claim 1 under 35 U.S.C. 103(a)
Exhibit #2F Response to Office Action of 02/10/00
Exhibit #2G Office Action of 05/09/00 making rejection of claim 1 FINAL
Exhibit #2H Petition under 37 CFR 1.181 requesting reversal of examiner's decision to make the Office Action of 05/09/00 FINAL
Exhibit #2I Decision of 06/12/00 denying petition of 06/25/00
Exhibit #2J Request for Reconsideration under of petition 1.181(f)
Exhibit #2K Request for Reconsideration by examiner under 37 CFR 1.111
Exhibit #2L Decision Denying Reconsideration of denial of 06/12/00
Exhibit #2M Notice of Appeal

Exhibits #3 Prior Art relied upon by examiner in making rejections.

Exhibit #3A U.S. Pat No. 5,761,976 to Bailey
Exhibit #3B U.S. Pat No. 4,577,532 to Cavalli

Exhibits #4 documents supporting an invention date earlier than the filing date of Bailey and diligence in pursuing a reduction to practice.

Exhibit #4A Notes dated 11-95
Exhibit #4B Drawings showing diligence

Exhibit # 5 Copy of Claim 1

EXHIBIT

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CHRONOLOGY

04/15/97 Bailey Filed (Exhibit #3A)**
01/05/98 Provisional Application Filed (Exhibit #2A)
06/09/98 Bailey Issued (Exhibit #3A)
12/28/98 Application filed (Exhibit #2B)
12/22/99 Office action requiring election/restriction
 (Exhibit #2C)
01/04/00 Election of claim 1 made (Exhibit #2D)
02/10/00 Office action rejecting claim 1 under 35 USC 103
 (Exhibit #2E)
03/08/00 Response to office action filed (Exhibit #2F)
05/09/00 Office action making 35 USC 103 rejection of
 claim 1 FINAL (Exhibit #2G)
05/25/00 37 CFR 1.181 petition requesting reversal of the
 examiner's making of the action of 05/09/00 FINAL
 (Exhibit #2H)
06/12/00 Decision denying petition.(Exhibit #2I)
07/10/00 Petition requesting reconsideration of decision
 of 06/12/00 (Exhibit #2J)
07/10/00 Request for examiner to reconsider making action
 of 05/09/00 FINAL. (Exhibit #2K) *
07/21/00 Petition of 07/10/00 denied (Exhibit #2L)
08/07/00 Notice of Appeal filed(Exhibit #2M)

*As of 09/01/00 no response to the request of 07/10/00 has been received.

** Exhibit #3B, is a copy of Cavalli 4,577,532, which is the other reference cited by the examiner in making his 35 U.S.C. 103 rejection of appellant's claim 1

PROVISIONAL APPLICATION
FILING RECEIPTUNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office
ASSISTANT SECRETARY AND COMMISSIONER
OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NUMBER	FILING DATE	FIL FEE REC'D	ATTORNEY DOCKET NO.	DRWGS
60/070,405	01/05/98	\$75.00		1

RUSSELL L JOHNSON
P O BOX 161
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EXHIBIT

2 A

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Receipt is acknowledged of this Provisional Application. This Provisional Application will not be examined for patentability. Be sure to provide the PROVISIONAL APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please write to Box Provisional Application within 10 days of receipt. Please provide a copy of the Provisional Application Filing Receipt with the changes noted thereon. This Provisional Application will automatically be abandoned twelve (12) months after its filing date and will not be subject to revival to restore it to pending status beyond a date which is after twelve (12) months from its filing date.

Applicant(s) MARK RASPER, OSHKOSH, WI; TIM RULSEH, NEENAH, WI.

FOREIGN FILING LICENSE GRANTED 02/09/98
TITLE
KNIFE INDEXING APPARATUS

* SMALL ENTITY *



EXHIBIT

2B

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KNIFE INDEXING APPARATUS

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefits of Provisional Patent Application 60/070,405 filed 01/05/98.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to non-rotating circular knives used in cutting cores to length.

More specifically, this invention relates to means for automatically indexing a core cutting knife to present a fresh cutting edge to the work.

BACKGROUND OF THE INVENTION

Non-rotating circular knives are a preferred instrument for cutting cores to length.

A common mode of cutting cores is to mount a length of core on a mandrel and position the core relative to a knife that is movable towards and away from the core. The core is then rotated and the knife advanced into the core until a core segment of the desired length is severed from the core. The knife is then retracted and the

core advanced on the mandrel to a new cutting position and the cycle is repeated.

The materials and methods used in forming cores are intended to make cores as tough and durable as is practical. The result is that cores are not easy to cut. Knife wear and thermal degradation as well as some mechanical damage are present in nearly every cut. This results in a relatively short life for the cutting edge and the frequent need to provide a new cutting edge.

Present practice is for an operator to monitor the cut and when he becomes aware that the knife had degraded to a point where the degradation is adversely effecting the cut, the knife is rotated to provide a new edge. Both the knife indexing apparatus and the method of indexing the knife are simple and straightforward.

Upon determination that the knife degradation requires the provision of a fresh cutting edge, an operator stops the cutting process, loosens the knife on its mount, rotates the knife to present a new edge, tightens the knife on its mount, and restarts the cutting process.

Heretofore, it has been common practice in the art to rotate the knife on a fixed mandrel to present a new cutting edge to the work. Typically, the rotation is done by hand and by eye and without regard to the direction in which the knife is rotated relative to the direction of rotation of the work being cut. As a consequence of this imprecise and unknowing approach, the number of knife repositionings that were had before the useful perimeter of the knife

was consumed was often four or less.

The indexing apparatus of this invention increases the number and quality of the cuts that can be made with a single knife while reducing knife cost and machine down time.

The indexing means of this invention enables the precise repositioning of the knife without interrupting a cutting cycle, and as a consequence makes practical the programming and automating of knife indexing so that operator intervention relating to the knife is required only to remove a consumed knife and replace it with a fresh one.

The present invention involves methods wherein the number of cuts are summed and when they reach a predetermined number, the knife is rotated to present a new edge. The core cutting operation is thereby rendered more efficient and safe. Advancements in technologies and techniques have permitted the improvement of the knife indexing apparatus to the point wherein it can be fully automatic and requires only infrequent operator attention.

It has been discovered that the pattern of knife edge degradation is not symmetrical about the radius of the knife along which the knife is advanced. This discovery has lead to the discovery that the angle through which a knife needs to be rotated to provide a new cutting edge for the cutter is greater in one direction of rotation than it is in the other direction of rotation. If the knife is rotated so that it moves with the direction of rotation of the core the angle of

rotation needed to reach a fresh edge is less than the angle of rotation needed to reach a fresh edge if the knife is rotated against the direction of rotation of the core.

This invention combines discoveries of the inventor with advances in the art to provide novel and unobvious improvements in a core cutting knife indexing apparatus.

It is an object of this invention to provide a knife indexing apparatus that combines known mechanisms and means with new discoveries and art knowhow to provide a knife indexing apparatus for non-rotating circular knife core cutters that is an improvement in the state of the art.

It is further an object of this invention to provide the knife indexing apparatus as described above wherein the combinations of mechanisms and means admit to automation to the degree that operator interaction is not required during the useful life of the circular knife.

It is further an object of this invention to provide the knife indexing apparatus as described above wherein art knowledge and discoveries are incorporated with suitable mechanisms and means to provide a knife indexing apparatus that is more efficient, accurate, and reliable than prior art core cutting knife indexing apparatus.

Other objects will be made apparent by the following specifications, claims and the attached drawings.

DESCRIPTION OF RELATED ART

The prior art does not provide an apparatus for automatically indexing a non rotating core cutting knife in the direction of rotation of the core to be cut.

Most of the technologies and mechanisms used in this invention are known in the core cutting art.

Prior art practices in repositioning non-rotating core cutting knives have been to rotate the knife against the rotation of the core to be cut to avoid introducing lash or play into the knife holding assembly or the rotations have been made without regard to the direction of rotation of the core to be cut.

It has been discovered that the degradation of the edge of the knife is not symmetrical about the radius along which the knife is advanced into the core. This invention embodies that discovery in an apparatus that repositions the core cutting knife by rotating it in the direction of least degradation. This permits the rotation of the knife through a smaller angle to reach a fresh edge than would be the case if the knife were rotated in the opposite direction. Depending on the thickness of the core being cut and the material that it is made of, this procedure results in the increase of one or more knife indexing cycles before the edge of the knife is completely degraded than would be the case if the knife were rotated in the opposite direction with the same degree of precision as provided by the index of this invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a fragmentary elevational schematic view of a fixed circular knife in the process of executing a core cut.

Figure 2 is a schematic pictorial view of the elements of the knife indexing apparatus of this invention illustrating the functional relationships of the elements of the indexing apparatus.

Figure 3 is a flow chart of the operation sequencing of the knife indexing apparatus of this invention.

Figure 4 is an elevational pictorial view in partial section showing a positional index for the knife of this invention.

BRIEF DESCRIPTION

The invention in one of its simplest forms is; a knife indexing apparatus comprising; a rotatable mandrel, a circular knife fixedly mounted on said mandrel, a worm gear fixedly mounted on said mandrel, a worm having a shaft and the worm is operably engaged with said worm gear, an overrunning coupling engaged with said shaft of said worm, a rotary actuator connected to the overrunning coupling and a means for actuating said coupling so as to rotate said knife through a set angle in the direction of rotation of a core to be cut.

The method of operating said knife indexing apparatus comprises the steps of; advancing a knife indexing apparatus into a core to effect a core cut, withdrawing the knife indexing apparatus, incrementing a counter, interrogating the counter, repeating the cycle until the counter indicates a preestablished condition, activating a rotary

actuator which rotates the overrunning coupling to rotate the shaft of the worm a preestablished distance which causes the worm gear to rotate the mandrel which causes the knife to rotate through a preestablished angle, returning the overrunning coupling to its starting position, returning the counter to its starting position, and starting a new knife indexing cycle.

DETAILED DESCRIPTION

In the drawings like numbers refer to like objects and the proportions of some elements have been modified to facilitate illustration.

Referring now to figure 1 wherein core 1 is shown to rotate in the direction of arrow C. Non-rotating knife 2 is advancing radially in the direction of arrow K to effect a core cut. As knife 2 advances into core 1 friction and heat build up and cause degradation of knife 2 in a pattern shown as cross hatched degradation area 3. When the edge of knife 2 has degraded to the degree that a new edge should be presented along radial axis A, it can be seen that knife 2 will present a new edge along axis A when rotated through an angle S in the direction of rotation of arrow C. A rotation through an angle L will be required to present a new edge when knife 2 is rotated in the direction against rotation arrow C. Angle L is appreciably greater than angle S.

The illustrations of figure 1 are schematic and the above descriptions of the phenomenon are incomplete, but they will serve to communicate the discovery that the degradation of knife 2 is not uniform about its radial cutting axis. They will also serve to

communicate the collateral discovery that rotation of knife 2 in the direction with the rotation of core 1 will result in a smaller angle of rotation to reach a new edge than would be the case if knife 2 were rotated against the direction of rotation of core 1. As a result, more fresh cutting edges can be indexed into position when rotating knife 2 in one direction than would be the case if knife 2 were rotated in the opposite direction.

It has been found that significant savings in knife cost due to an increase in the number of quality cuts achievable per knife and significant operating cost savings due to reductions in machine down time can be achieved by employing automated apparatus to perform the various tasks now performed manually. The knife indexing apparatus of figure 2 is a preferred method of providing an automated knife indexing apparatus for core cutters.

Referring now to figure 2 wherein a knife indexing apparatus 10 is illustrated schematically. Knife indexing apparatus 10 has knife 2 fixedly mounted on rotatable arbor 11. Arbor 11 has fixedly mounted thereon worm gear 12 which is operably engaged with rotatable worm 13 which has as a part thereof, worm shaft 14. Shaft 14 is joined to overrunning coupling 15. Overrunning coupling 15 has the characteristic that it will rotate worm shaft 14 when rotated in one direction and will rotate on worm shaft 14 when rotated in the opposite direction. Overrunning coupling 15 is engaged with rotary actuator 16 which serves to rotate overrunning coupling 15 through a preset angle and then counter rotate it to its starting position.

The apparatus described above is capable of indexing the knife in the

interval between the end of one cut and the beginning of another cut so that the core cutting operations need not be interrupted to index the knife. The precision, efficiency, and reliability of the knife indexing is enhanced by the employment of modern electronic sensing and control means. In figure 2 event sensor 17 serves to detect each cutting cycle of apparatus 10. A signal is transmitted to index controller 18. Controller 18 interprets the signal from sensor 17 and when programmed to do so sends an indexing command to rotary actuator 16 to index knife 2.

Referring now to figure 3 which is a flow chart illustrating the operational sequencing of a fully automated core knife indexing apparatus that would require no operator intervention during the useful life of the knife edge.

The angle through which the knife is rotated in one repositioning or indexing cycle is in the preferred embodiment set into the indexing apparatus and remains constant for the apparatus until changed by a resetting procedure. The cut counter and the index counter are set at zero and return to that value when reset.

The operational sequence after the start 30 of the core cutting operation is to; cycle 31 the knife through a cut; step the cut counter 32 (add one); interrogate the cut counter 33, if the cut counter has not reached the set value, take the return path to another cutting cycle 31; if the cut counter 33 has reached the set value take the knife index 34 path and index the knife; then step the index counter (add one); interrogate the index counter 36; if the index counter has not reached the set value, take the path to reset

the cut counter 37 to zero and return to cycle 31 to again start a cut counting sequence; if the index 36 has reached the set value, activate a signal 38 and stop cutting operations.

The above sequence permits the continuous operation of the core cutter during the useful life of the knife.

Referring now to figure 4 wherein a arbor 40 is provided with positional index 41 which is here shown as a key and keyway which is a common positional index used in the art.

The above disclosures are enabling and teach the best methods of practicing the invention known to the inventors at the time the invention was made. The apparatus of this invention comprises Mechanisms, apparatus and technologies that are known in the art separately and in different combinations. Further, equivalent mechanisms, apparatus and technologies could be substituted for those disclosed above without departing from the novel combination of elements of this invention.

Therefore, the scope of this invention should not be limited by the above disclosures but the scope of this invention should be limited only by the scope of the appended claims and all equivalents thereto that would become apparent to one skilled in the art.

What is claimed is:

Claim 1

An indexing means for a non-rotating circular core cutting knife comprising;

- a) a circular knife defining a central orifice and a positional index adjacent to the central orifice,
- b) a knife mounting mandrel sized to pass through and closely fit the central orifice,
- c) an positional index engaging means secured to the mandrel,
- d) a means for securing the knife in place on the mandrel,
- e) a worm gear secured to the mandrel,
- f) a worm shaft having as a part thereof a worm and the worm is operably engaged with the worm gear,
- g) an overrunning coupling operably secured to the worm shaft so that the coupling in an engaged portion of a cycle rotates the knife in the direction of rotation of a core being cut.
- h) a means for counting cutting cycles of the knife and a means for counting indexing cycles of the indexing means,
- i) a means for activating the knife indexing means when a preset number of cutting cycles has been completed and a means for

terminating cutting operations when a predetermined number of indexing cycles has been completed and a predetermined number of cutting cycles has been completed.

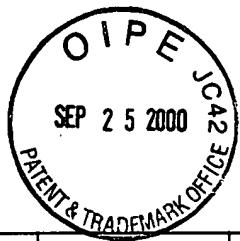
Claim 2

A method of automating the operations of the means of claim 1 comprising: the steps of,

- a) making a cut,
- b) stepping a cut counter,
- c) interrogating the cut counter,
- d) repeating steps a-c until the cut counter reaches a preset value,
- e) indexing the knife,
- f) stepping an index counter,
- g) interrogating the index counter
- h) resetting the cut counter,
- i) repeating steps a-h until the index counter reaches a preset value,
- j) terminating cutting operations when the index counter has reached the preset value.

ABSTRACT

The invention is for a knife indexing apparatus for a non-rotating core cutting knife and a means for automatically indexing the knife during core cutting operations. The apparatus employs the discovery that by indexing the knife in the direction of rotation of the core, at least one additional fresh cutting edge can be presented to the work than would be the case if the knife were rotated in the direction opposite to the direction of rotation of the core to be cut.

**UNITED STATES DEPARTMENT OF COMMERCE****Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

09/222,282 12/28/98 RASPER

14

QM12/1222

EXAMINER

RUSSELL L. JOHNSON
P O BOX 161
WEYAUWEGA WI 54983

TRAN, K

ART UNIT	PAPER NUMBER
----------	--------------

3724

DATE MAILED:

12/22/99

EXHIBIT

subscr

2C

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No. 09/222,282	Applicant(s) Rasper et al.
Examiner Kim Ngoc Tran	Group Art Unit 3724



Responsive to communication(s) filed on SEP 25 2000.

This action is FINAL.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1035 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 1 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

Claim(s) 1 and 2 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

Claim(s) _____ is/are allowed.

Claim(s) _____ is/are rejected.

Claim(s) _____ is/are objected to.

Claims 1 and 2 are subject to restriction or election requirement.

Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on _____ is/are objected to by the Examiner.

The proposed drawing correction, filed on _____ is approved disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been

received.

received in Application No. (Series Code/Serial Number) _____.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 3724



DETAILED ACTION

Election/Restriction

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claim 1, drawn to an indexing means for non-rotating circular core cutting knife, classified in class 83, subclass 72.
 - II. Claim 2, drawn to method for automating the operations of an indexing means, classified in class 83, subclass 34.
2. The inventions are distinct, each from the other because of the following reasons:
Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case, the process of automating the operations of an index means is applicable to similar devices that may include a knife, worm gear, mandrel, and controller.
3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.



Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(I).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kim Ngoc Tran whose telephone number is (703) 305-2597.

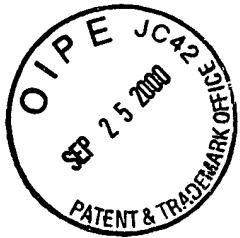
6. Any general inquiry relating to this application can be directed to the Group receptionist at (703)-308-1148 or Supervisory Patent Examiner, Rinaldi Rada, at (703)-308-2187. Please submit facsimiles to the Group fax number at (703)-305-3579.

A handwritten signature consisting of stylized initials and the surname "Rachuba".

M. Rachuba
Primary Examiner

KNT

December 13, 1999



EXHIBIT

2 D

ELECTION/RESTRICTION

Title: KNIFE INDEXING APPARATUS
Inventor: Mark Rasper
Filed: 12/28/99
Serial No.: 09/222,282
Art Unit: 3724
Examiner: K. Tran

To the Commissioner of Patents and Trademarks
Washington D.C. 20231

Sir:

This communication is responsive to the office action of 12/22/99
in the above described patent application.

The applicant elects to prosecute claim 1.

Claim 2 is herewith withdrawn from consideration at this time
without prejudice.

Submitted by

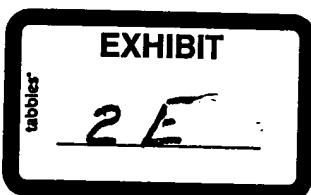
A handwritten signature in cursive ink, appearing to read "Russell L. Johnson".

Russell L. Johnson
Patent Agent (26,918)
P.O. Box 161
Weyauwega WI. 54983
920/867-3482

**UNITED STATES DEPARTMENT OF COMMERCE****Patent and Trademark Office**Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
US 1223,284	11/14/98/98	RASPER	14

RUSSELL L. JOHNSON
P O BOX 161
WEYAUWEGA WI 54983



DMR: 27/02/01

EXAMINER

TRAN, K

ART UNIT

PAPER NUMBER

2724/H

DATE MAILED:

02/10/00



Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

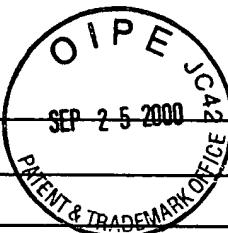
Office Action Summary	Application No. 09/222,282	Applicant(s) Rasper et al.
	Examiner Kim Ngoc Tran	Group Art Unit 3724

Responsive to communication(s) filed on Jan 4, 1900

This action is FINAL.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle 835 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).



Disposition of Claim

Claim(s) 1 and 2 is/are pending in the application.
 Of the above, claim(s) 2 is/are withdrawn from consideration.

Claim(s) _____ is/are allowed.

Claim(s) 1 is/are rejected.

Claim(s) _____ is/are objected to.

Claims _____ are subject to restriction or election requirement.

Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on _____ is/are objected to by the Examiner.

The proposed drawing correction, filed on _____ is approved disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been received.

received in Application No. (Series Code/Serial Number) _____.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 3724



DETAILED ACTION

Election/Restriction

1. Applicant's election without traverse of claim 1 in Paper No. 3 is acknowledged.
2. Claim 2 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b) as being drawn to a non-elected invention. Election was made **without** traverse in Paper No. 3.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey in view of Cavalli. Bailey discloses the invention substantially as claimed except for the use of worm gears and shaft. However, Cavalli teaches the use of such feature as a mechanism to automatically rotate a cutting tool (reference column 2, lines 9-16). In view of Cavalli, it would have been obvious to one having skill in the art to provide Bailey's device with a worm gear to rotate a cutting tool since a worm gear mechanism is well-known in the art and can easily be utilized.



Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Looser, Pienta, Robinson, Birkestrand, Borzym, Li et al., and Pertle are cited to show related devices.
6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kim Ngoc Tran whose telephone number is (703) 305-2597.
7. Any general inquiry relating to this application can be directed to the Group receptionist at (703)-308-1148 or Supervisory Patent Examiner, Rinaldi Rada, at (703)-308-2187. Please submit facsimiles to the Group fax number at (703)-305-3579.

A handwritten signature in black ink, appearing to read "Rinaldi I. Rada".

Rinaldi I. Rada
Supervisory Patent Examiner
Group 3700

KNT

January 31, 2000

Notice of References Cited			Application No. 09/222,282	Applicant(s) Rasper et al.		
			Examiner Kim Ngoc Tran	Group Art Unit 3724	Page 1 of 1	
U.S. PATENT DOCUMENTS						
	DOCUMENT NO.	DATE	NAME		CLASS	SUBCLASS
A	4,646,601	3/3/87	Borzym		83	54
B	4,476,753	10/16/84	Li et al.		83	54
C	5,761,976	6/9/98	Bailey		83	955
D	4,577,532	3/25/86	Cavalli		74	841
E	4,693,157	9/15/87	Looser		83	431
F	4,614,136	9/30/86	Pertle		82	44
G	4,776,248	10/11/88	Birkestrand		82	4
H	5,603,250	2/18/97	Robinson		82	56
I	5,555,783	9/17/96	Pienta		82	96
J						
K						
L						
M						
FOREIGN PATENT DOCUMENTS						
	DOCUMENT NO.	DATE	COUNTRY	NAME	CLASS	SUBCLASS
N						
O						
P						
Q						
R						
S						
T						
NON-PATENT DOCUMENTS						
	DOCUMENT (Including Author, Title, Source, and Pertinent Pages)					DATE
U						
V						
W						
X						



EXHIBIT

2F

RESPONSE TO OFFICE ACTION

Title: KNIFE INDEXING APPARATUS
Inventor: Mark Rasper et al.
Serial No.: 09/222,282
Filing Date: 12/28/98
Art Unit: 3724
Examiner: Kim Ngoc Tran

To the Assistant Commissioner of Patents

Washington D.C. 20231

Sir;

This communication is responsive to the office action of 02/10/00 in the above described patent application.

The applicant thanks the examiner for his examination of the instant patent application.

THE REJECTION

Claim 1 is rejected under 35 USC 103(a) as being unpatentable over Bailey in view of Cavalli.

THE ISSUES

The applicant argues that Bailey was not available as a 35 USC 103(a) reference at the time the invention was made.

The applicant further argues that, absent Bailey as a reference, the applicant cannot properly argue that the prior art of record taken as a whole did not render the instant invention obvious at the time the invention was made because the examiner's 35 USC 103(a) rejection of claim 1 relies heavily upon Bailey.

The applicant further argues that the incorporation by reference of his Provisional Patent Application; serial no 60/070,405 filed 01/05/98 into the instant patent application constitutes evidence of a constructive reduction to practice of the invention as of the filing date of the Provisional Patent Application.

ARGUMENTS

The critical dates related to the issue above are:

01/05/98

Provisional Patent Application 60/070,405 was filed for the instant invention.

06/09/98

U.S. Patent No: 5,761,976 to Bailey, was issued.

12/28/98

Patent Application 09/222/282 was filed for the instant invention wherein the first item of the specifications states "This application claims the benefits of Provisional Patent Application 60/070/405 filed 01/05/98.

Authorities relied on are;

MPEP 715.07 (page 700-147, column 1 last sentence of first paragraph.)

"...(filing constitutes a constructive reduction to practice, 37 CFR 1.131).

35 USC 103(a)

"...that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art..."

U.S. Patent No. 5,761,976 to Bailey became available as a 35 USC 103(a) prior art reference as of 06/09/98.

The applicant's Provisional Patent Application filed 01/05/98 constitutes a constructive reduction to practice of the invention and the averments made in the Declaration filed therewith establish that the time that the invention was made, proceeds the date of availability of Bailey as 35 USC 103(a) reference.

Therefore, the examiner's 35 USC 103(a) rejection of the applicant's claim 1 is not properly taken and the applicant request that the examiner so find and that the 35 USC 103(a) rejection of claim 1 be withdrawn and that claim 1 be found to be allowable under 35 USC 103(a)

Differences between the language of claim 1 and that of the Provisional Application arise from the requirement that the applicant disclose the best mode of practicing the invention known to the inventor at the time of filing of the application and the requirement that the claims clearly state and particularly point out that which he regards as his invention.

There being no other issues pending in this patent application the applicant requests that claim 1 be found to be allowable and that his application for a KNIFE INDEXING APPARATUS allowed to issue as a United States Letters Patent.

By



Russell L. Johnson

Patent Agent (26,918)

P.O. Box 161

Weyauwega WI 54983



UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/222,282	12/28/98	RASPER	M

RUSSELL L. JOHNSON
P.O. BOX 161
WEYAUWEGA, WI 54983

EXHIBIT

2G

QH32/0509



EXAMINER

TRAN, K

ART UNIT

PAPER NUMBER

3724

DATE MAILED:

05/09/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No. 09/222,282	Applicant(s) Rasper et al.
Examiner Kim Ngoc Tran	Group Art Unit 3724

Responsive to communication(s) filed on 3/8/00

This action is FINAL.

Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle 1035 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

Claim(s) 1 is/are pending in the application.
Of the above, claim(s) _____ is/are withdrawn from consideration.

Claim(s) _____ is/are allowed.

Claim(s) 1 is/are rejected.

Claim(s) _____ is/are objected to.

Claims _____ are subject to restriction or election requirement.



Application Papers

See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

The drawing(s) filed on _____ is/are objected to by the Examiner.

The proposed drawing correction, filed on _____ is approved disapproved.

The specification is objected to by the Examiner.

The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

All Some* None of the CERTIFIED copies of the priority documents have been received.

received in Application No. (Series Code/Serial Number) _____.

received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

Notice of References Cited, PTO-892

Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

Interview Summary, PTO-413

Notice of Draftsperson's Patent Drawing Review, PTO-948

Notice of Informal Patent Application, PTO-152

... SEE OFFICE ACTION ON THE FOLLOWING PAGES ...

Art Unit: 3724

**DETAILED ACTION**

1. This office action is response to applicant's communication received on March 8, 2000.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey in view of Cavalli as set forth in the previous office action.

Response to Arguments

3. Applicant's arguments have been fully considered but they are not persuasive.

Applicant contends that Bailey was not available as a 35 USC 103(a) reference at the time of the invention because Bailey, U.S. Patent No. 5,761,976 was issued 6/9/98 while applicant's invention claims priority of the Provisional Patent Application 60/070,405 filed on 1/5/98.

However, had Bailey been cited as a rejection under 35 U.S.C. 102, it would have qualified as a 35 U.S.C. 102(e) which is reliant on the filing date. Therefore, Bailey as a 35 U.S.C. 103 (a) reference is deemed proper.

Art Unit: 3724



Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kim Ngoc Tran whose telephone number is (703) 305-2597.

6. Any general inquiry relating to this application can be directed to the Group receptionist at (703)-308-1148 or Supervisory Patent Examiner, Rinaldi Rada, at (703)-308-2187. Please submit facsimiles to the Group fax number at (703)-305-3579.


knt
May 5, 2000


Rinaldi I. Rada
Supervisory Patent Examiner
Group 3700



PETITION UNDER 37 CFR 1.181

AND

MPEP 1002.02(c)(3)

Title: KNIFE INDEXING APPARATUS
Inventor: Mark Rasper
Filed: 12/28/99
Serial No.: 09/222,282
Art Unit: 3724
Examiner: K. Tran

To the Commissioner of Patents and Trademarks
Washington D.C. 20231

Attention: GROUP DIRECTORS [R1]

On May 9, 2000 examiner Kim Ngoc Tran, apparently with the approval of Supervisory Patent Examiner Rinaldi I. Rada, in response to the applicants communication of 3/8/80, issued an office action in which he presented new grounds for rejection and made new arguments and made the action FINAL.

In previous matters before art unit 3724, telephone conferences, informal requests to reconsider and amendments filed after final rejection and submitted to place the application in order for appeal failed in their intent and changed no opinions and resolved no issues. In the interest of maintaining focus on the issues now present in the application and the speedy resolution thereof, the applicant has eschewed the requesting reconsideration under 37 CFR 1.111 and filing an amendment after final rejection.

BACKGROUND OF THE PETITION

The instant application was filed on 12/28/98. It claimed the



benefits of Provisional Patent Application 60/070,405 filed 01/05/98. It contained two claims.

On 12/22/99 examiner Tran issued an office action requiring election/restriction.

On 01/4/00 the applicant responded to the requirement of 12/22/99 and elected to prosecute claim 1.

On 02/10/00 examiner Tran with the apparent approval of Supervisory Examiner Rada rejected claim 1 under 35 USC 103(a) as being unpatentable over Bailey in view of Cavelli. The issue date of Bailey is 06/09/98.

On 03/08/00 the applicant filed a response to examiner Tran's action of 02/10/00. He established that his Provisional Patent application was filed 01/05/98 and therefore Bailey was not available as a 35 USC 103 (a) reference on the date the invention was made.

On 05/09/00 examiner Tran with the apparent approval of Supervisory Examiner Rada issued an Office Action finally rejecting claim 1 (a copy of the Office Action is attached) and presenting a theory that had Bailey been cited as a rejection under 35 USC 102 it would have qualified as a 35 USC 102 (e) rejection which is reliant on the filing date. The examiner does not make the hypothetical 35 USC 102(e) rejection and has cited no authority in support of his theory.

DISCUSSION OF THE APPLICABLE LAW

The examiners Tran and Rada's introduction of 35 USC 102(e) grounds for holding their 35 USC 103 rejection as proper based on hypothetical availability of Bailey as a 35 USC 102(e) anticipatory reference, is a new grounds for rejection and a new argument not previously presented and not necessitated by any amendment made by the applicant. By making the action final, the examiners deny the applicant a right to a full and fair

examination process.

Since it can be anticipated that a board of appeals would require the examiners to at the least cite an authority justifying the use of section 35 USC 102 practice as justification for an action taken in case where no 35 USC 102 rejection is present and to vacate a FINAL rejection which makes the applicant aware for the first time of a need to swear behind the filing date of the reference.

SUMMARY

For the forgoing reasons and to avoid unnecessary process and remand from a board of appeals, it is submitted that patent examiners erred in making the action of 05/09/00, FINAL and reversal is respectfully requested.

Respectfully Submitted,

Russell L. Johnson
Patent Agent (26,918)
P.O. Box 161
Weyauwega WI. 54983
920/867-3482





UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, DC 20231
www.uspto.gov

JUN 12 2000



Paper No. 8

In re Application of

Mark Rasper

Application No. 09/222,282

Filed: December 28, 1998

For: Knife Indexing Apparatus

: DECISION ON PETITION

:

:

This is a decision on the petition filed on May 25, 2000 requesting that the finality of the Office letter dated May 9, 2000 be withdrawn. The petition is considered pursuant to 37 CFR § 1.181, and no fee is required for the petition. A refund of the \$130.00 petition fee tendered will be scheduled.

The petition is denied.

Petitioner sets forth the facts upon which relief is requested, and a review of the file confirms that the facts are as follows:

1. The instant application was filed on December 28, 1998.
2. As filed, the instant application claims benefit of provisional application 60/070,405.
3. Provisional patent application 60/070,405 was filed on January 5, 1998.
4. In response to a restriction requirement promulgated on December 22, 1999, petitioner filed an election to prosecute claim 1 on January 4, 2000.
5. In an Office letter dated February 10, 2000, claim 1 was rejected under 35 USC 103(a) as being unpatentable over the patent to Bailey in view of the patent to Cavelli.
6. The patent to Bailey issued on June 9, 1998 on an application filed on April 15, 1997.
7. On March 8, 2000, petitioner replied to the Office letter dated February 10, 2000 by traversing the rejection on the grounds that petitioner was entitled to benefit of the provisional application date of January 5, 1998, and that the Bailey patent was therefore unavailable as prior art in a section 103(a) rejection.
- 8.. In the Office letter dated May 9, 2000, the rejection of claim 1 was repeated on the grounds that the claim was unpatentable under 35 USC 103(a) over the patent to Bailey in view of the patent to Cavelli, "as set forth in the previous Office action". This letter was made final.

9. In response to the arguments presented by petitioner regarding the unavailability of the Bailey patent as prior art because of petitioner's entitlement to the filing date of the provisional application, the Office letter dated May 9, 2000 included a reply to the effect that the Bailey patent qualified as prior art under 35 USC 102(e) because the filing date of the Bailey patent was earlier than the filing date of petitioner's provisional patent application. The examiner concluded that for this reason, it was proper to apply the Bailey patent as prior art in an obviousness rejection under 35 USC 103(a).

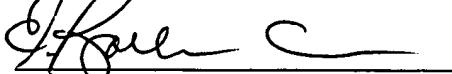
As discussed below, these facts fail to demonstrate that the examiner committed clear error, or abused his discretion by acting in an arbitrary or capricious manner in making the Office letter dated May 9, 2000 final.

MPEP 706.07(a) requires that the second Office action on the merits (patentability of the claims) be made final except where the examiner introduces a new ground of rejection of the claims not necessitated by applicant's amendment of the claims. Here, the original claim was not amended, and the second action on the merits repeated exactly the same rejection of that claim as was set forth in the first action on the merits. Petitioner appears to be confusing the examiner's reply to petitioner's traverse of the first Office action on the grounds that "the Bailey patent is unavailable as a 35 USC 103(a) reference" with a new ground of rejection. The examiner's reply to petitioner's traverse merely pointed out that on the facts of this case, the examiner considered that entitlement to the benefit of the provisional application filing date did not remove the Bailey patent from the status of prior art, because the Bailey patent qualified as prior art under 35 USC 102(e). Because the examiner believed that Bailey patent qualifies as prior art under 35 USC 102(e), the examiner maintained the 35 USC 103(a) initially advanced in the first Office action. Stating this belief did not change the grounds of rejection in the final action, or convert the rejection into a rejection that differed from the rejection made in the first Office action. No anticipation rejection under 35 USC 102(e) was made in the final Office action.

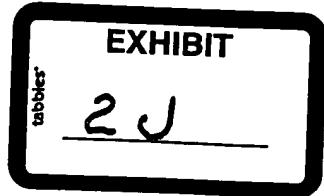
Because the final action contains the same ground of rejection that was made in the first Office action and does not contain any new ground of rejection, it appears that the examiner acted properly in making the second Office action final. The presence of the examiner's reply to petitioner's argument that the provisional application renders the Bailey patent unavailable as a reference does not constitute a new ground of rejection, especially since no new interpretation of the teachings of the Bailey patent are relied upon in the section 103 rejection. Petitioner is not entitled to the relief requested in the petition merely because of the reply by the examiner to petitioner's argument.

Any request for reconsideration of this decision must be filed within two months from the date of the decision, 37 CFR § 1.181(f). Petitioner is reminded that the filing of the petition does not stay the running of the shortened statutory period for filing a reply to the final Office action dated May 9, 2000, and that the filing of a request for reconsideration of this decision will not stay the running of that shortened statutory period.

PETITION DENIED.


E. Rollins-Cross, Director, Patent
Examining Groups 3710 and 3720

RUSSELL L. JOHNSON
P. O. BOX 161
WEYAUWEGA, WI 54983



REQUEST FOR RECONSIDERATION
UNDER 37 CFR 1.181(f)

Title: KNIFE INDEXING APPARATUS
Inventor: Mark Rasper
Filed: 12/28/99
Serial No.: 09/222,282
Art Unit: 3724
Examiner: K. Tran

To the Commissioner of Patents and Trademarks
Washington D.C. 20231

ATTENTION: E. ROLLINS-CROSS
Director, Patent Examining Groups 3710 and 3720

Sir;

This is a petition asking Director Rollins-Cross to reconsider the decision made June 12, 2000 with regard to the petition filed by the applicant on May 25, 2000 in the above described patent application.

As stated in the petition of May 25, 2000 the applicant is seeking a right to respond to the office action of 05/09/00 in the above described patent application and to avoid if possible the need for appeal and remand.

The applicant submits that his response to the office action of 02/10/00 was a bonafide effort to resolve the question of availability of Bailey (U.S. 5,761,976) as a 35 U.S.C. 103(a) reference in rejecting applicants claim 1. On that basis, the examiner is not required to make the next office action final. To the extent that the examiner's decision to make the office action of 05/09/2000 final was discretionary it is submitted that he arbitrarily chose to do so.

In the office action of 02/10/00 (first office action) Bailey was not cited as a 35 U.S.C 102 reference and the examiner noted that Bailey differed materially from the claimed invention in that Bailey was absent a worm and worm gear. The worm and worm gear are central and critical to the applicants invention. Therefore Bailey would not qualify as an anticipatory reference. No mention whatsoever was made in the action of 02/10/00 to 35 U.S.C 102.

In the office action of 05/09/2000 (second office action) the subject of 35 U.S.C 102 is raised for the first time by the examiner. He raises the matter as a hypothetical argument that "However, had Bailey been cited as a rejection under 35 U.S.C 102 it would have qualified as a 35 U.S.C 102(e) which is reliant on the filing date. Therefore, Bailey as a 35 U.S.C. 103(a) reference is deemed proper.". It is submitted that matter presented for the first time is new matter, and arguments made for the first time are new arguments. It is further submitted that to deny an applicant the right to respond to a novel argument made for the first time in an office action that is made final is inherently unfair.

In the office action of 05/09/00 examiner Tran does not state that Bailey is a proper 35 U.S.C 102 anticipatory reference nor make a 35 U.S.C. 102 rejection. Had he done so the applicant could possibly have traversed that rejection or sworn behind the filing date of the reference. To deny him the right to do so is inherently unfair.

In the office action of 05/09/00 and specifically in the quotation cited in the previous paragraph, examiner Tran's determination that "Bailey as a 35 U.S.C 103(a) reference is deemed proper.", the examiner quotes no authority, cites no case law, and relies on no rule or law in giving to Bailey the standing as a 35 U.S.C. 103(a) reference as of its filing date and based on a hypothetical "had Bailey been cited as a rejection under 35 U.S.C. 102...". If there is a 35 U.S.C 102 exception to the "at the time the invention was made" clause in 35 U.S.C. 103 the examiner has not provided the applicant with citations that would enable him to respond to the examiner's interpretations of those citations. That is inherently unfair. The examiners finding that "Therefore, Bailey as a 35 U.S.C. 103 (a) reference is deemed proper.", is arbitrary and is without foundation in fact or law.

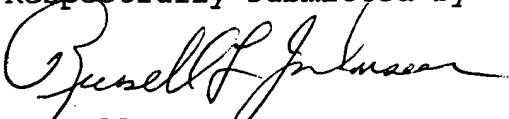
The applicant respectfully submits that; examiner Tran's finding based on a hypothetical possibility that a non 35 U.S.C. 102 reference could have been used as a 35 U.S.C. 102 reference, and therefore the reference is available as a 35 U.S.C. 103 reference, is clear error. Were it proper, it would make it necessary to amend 35 U.S.C.103 to delete the "at the time the invention was made" clause. The effect of sustaining examiner Tran's rejection on appeal would be to render all 35 U.S.C 103 references available as of their filing date because they could have been cited as 35 U.S.C.102 references.

The applicant respectfully submits that examiner Tran's finding that Bailey as a 35 U.S.C. 103 (a) reference is proper based on a hypothetical 35 U.S.C. 102 situation is clear error and would be reversed on appeal.

Therefore, the applicant petitions Director Rollins-Cross to reconsider the decision of June 12, 2000 and now find that examiner Tran's final rejection made in the office action of 05/09/00 is premature and that the action be vacated. The applicant asks that he be afforded a full and fair opportunity to respond to the examiner's findings, and decisions related to the applicability of 35 U.S.C. 102 dates of availability to 35 U.S.C. 103 references.

Reversal of the Decision on Petition of June 12, 2000 is respectfully requested.

Respectfully submitted by

 07/03/00
(copy)

Russell L. Johnson
Patent Agent (26,918)
P.O.Box 161
Weyauwega WI 54983
414/867-34820



REQUEST FOR RECONSIDERATION
UNDER 37 CFR 1.111

EXHIBIT

2K

Title: KNIFE INDEXING APPARATUS
Inventor: Mark Rasper
Filed: 12/28/99
Serial No.: 09/222,282
Art Unit: 3724
Examiner: K. Tran

To the Commissioner of Patents and Trademarks
Washington D.C. 20231

Sir:

This is a request under 37 CFR 1.111 for examiner Tran to reconsider his decision to make the office action of 05/09/00 final.

The applicant submits that in the office action of 05/09/00:

- 1) the examiner raises for the first time matters related to 35 USC 102,
- 2) the examiner argues for the first time that because a reference would be available as of its filing date in making a 35 U.S.C. 102 rejection it is available as of its filing date for the purpose of making a 35 U.S.C.103(a) rejection.
- 3) the examiner provides no citations of rule or law or procedure or precedence in support of his determination that Bailey is available as a 35 U.S.C. 103 reference as of its filing date and thereby denies the applicant a right to challenge the legal foundations of the examiners deeming

Bailey to be available as a 35 U.S.C. 103 (a) reference as of its filing date.

4) the examiner in making the action final denies the applicant the right to traverse the 35 U.S.C. 102 portion of the examiner's 35 U.S.C. 103 (a) rejection of claim 1.

5) the examiner in making the action final denies the applicant the right to respond to the examiner's arguments in support of availability of Bailey as a 35 U.S.C. 103 (a) reference as of the filing date of Bailey.

The examiner rejects claim 1 under 35 U.S.C. 103 (a) as being unpatentable over Bailey in view of Cavalli as set forth in the previous action.

In the previous action the examiner states "Bailey discloses the invention substantially as claimed except for the use of worm gears and shaft." The worm shaft, worm, and worm gear are central and critical to the invention of claim 1. Bailey does not show teach or claim a worm shaft, a worm, or a worm gear. Therefore Bailey is not an anticipatory reference under 35 U.S.C. 102.

Further. Cavelli does not show teach or claim a worm shaft, a worm, or a worm gear.

The applicant submits the prior art references relied upon by the examiner do not show, teach or claim a worm shaft, a worm, and a worm gear. Therefore, they do not provide a motive to look in the direction of a worm shaft, worm, and a worm gear as an indexing means.

Further, the threaded tool advancing means of Cavelli advances a rotating tool towards a work piece. The worm and worm gear of this invention indexes a non-rotating tool which is advanced by associated means into a workpiece. The means for rotation and advancement of the tool of Cavelli is a hand wheel and threaded

shaft which is different from the worm and worm gear means for rotation and indexing of the tool of this invention. The mode of operation of the threaded tool advancement of Cavelli is different from the mode of operation of the worm and worm gear tool indexing means of this invention. The end achieved by the threaded tool advancement means of Cavelli is different from the end achieved by the worm and worm gear tool indexing means of this invention. Cavelli is from an art area that is remote from the core cutting art.

The applicant respectfully submits that the examiner's argument "in view of Cavelli, it would have been obvious to one having skill in the art to provide Bailey's device with a worm gear to rotate a cutting tool since a worm gear mechanism is well-known in the art" is a hindsight construction of the examiner which would require one skilled in the art to find the means of rotation, the mode of operation and the end achieved by the worm and worm gear of this invention in Cavelli where neither a worm or worm gear is present and indexing is not a function of Cavelli. One skilled in the art would then need to be motivated to transfer this metamorphosis to the core cutting art to apply it to Bailey. Cavelli taken as a whole does not meet the language of claim 1 nor does Cavelli provide motivation for one skilled in the art to look in the direction of worm and worm gear as an indexing means nor to look in the direction of the core cutting art to apply as an indexing means the worm and worm gear which is at the heart of and is a part of the essence of the invention of claim 1.

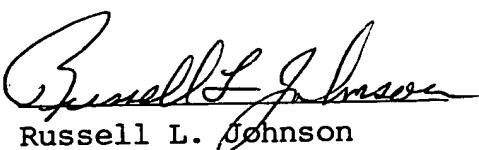
Further the applicant respectfully submits that Bailey was not in fact a part of the prior art at the time the instant invention was made and therefore the prior art relied on by the examiner taken as a whole can not render the applicants claim 1 obvious under 35 U.S.C. 103 (a). The applicant now asks that the examiner so find and that he find applicant's claim 1 to be allowable under 35 U.S.C. 103 (a).

With regard to the examiner's finding that Bailey is available as

a 35 U.S.C. 103 (a) prior art reference as of its filing date, the applicant respectfully submits that the finding is clear error and that at the very least the applicant's right to respond to a legal foundation for the finding should be honored and the examiner at the very least find the making final of the office action of 05/09/00 was premature and that the applicant be afforded a full and fair opportunity to respond to and to traverse the examiner's findings as to the effective date of Bailey and to swear behind the effective date of Bailey if need be.

Therefore, allowance of claim 1 is now respectfully requested and that failing, a finding that the making final of the the action of 05/09/00 is premature is respectfully requested.

Submitted by

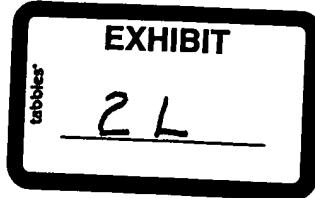

Russell L. Johnson 07/03/00
Patent Agent
P.O. Box 161
Weyauwega WI 54983
920/867-3482



UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, DC 20231
www.uspto.gov

JUL 21 2000



Paper No. 10

In re Application of
Mark Rasper
Application No. 09/222,282
Filed: December 28, 1998
For: Knife Indexing Apparatus

: DECISION ON REQUEST
: FOR RECONSIDERATION
:

This is a decision on petitioner's request for reconsideration of the decision dated June 12, 2000 denying the original petition to withdraw the finality of the Office letter dated May 9, 2000. The request for reconsideration was timely filed on July 10, 2000.

The request for reconsideration is denied.

Familiarity with the original petition and the decision therein is presumed. In brief, in the first Office action, the examiner advanced a rejection for obvious under 35 USC 103 based upon two United States patents considered together, the Bailey patent and the Cavalli patent. In reply, petitioner argued petitioner was entitled to benefit of a provisional application and that the Bailey patent was therefore not available as a prior art reference in a 35 USC 103(a). In the next Office action, the examiner repeated exactly the same rejection as was advanced in the first Office action, and made the action final. The final action included the examiner's comments that the Bailey patent was indeed qualified as prior art under 35 USC 102(e) because it had an earlier filing date than the filing date of the provisional patent.

Petitioner continues to rehash the arguments presented in the original petition. Again, no rejection under 35 USC 102(e) was ever made. The examiner merely replied to an argument made by petitioner that the Bailey patent was not prior art. The examiner's reply explained why the Bailey patent was indeed qualified as prior art. That the examiner's reply relied upon the words 35 USC 102(e) and the words contained within that statutory provision did not convert the examiner's rejection under 35 USC 103(a) to anything other than precisely that, a rejection under 35 USC 103(a). The examiner was clearly within the practice set forth at MPEP 706.07(a) in making the second action final.

Petitioner may wish to consider the decision of the United States Court of Customs and Patent Appeals entitled *In re Wertheim and Mishkin*, 646 F.2d 527; 209 U.S.P.Q. 554, April 9, 1981; Amended April 15, 1981. The following language appears in the decision, beginning at 209 U.S.P.Q. 560:

"While nowhere in Title 35 are the words 'prior art' defined, the Senate and House Reports accompanying the 1952 [**15] Patent Act state:

[Section 103] refers to the difference between the subject matter sought to be patented and the prior art, meaning what was known before as described in Section 102. S.Rep. No. 1979, 82d Cong., 2d Sess., U.S. Code Cong. & Admin. News at 2399.

Additionally, one draftsman of and the commentator on the 1952 Act, P.J. Federico, commented that:

The antecedent of the words "the prior art" * * * lies in the phrase "disclosed or described as set forth in Section 102" and hence these words refer to the material specified in Section 102 as the basis for comparison. Federico, Commentary On The New Patent Act, 35 USCA p. 1 at 20 (1954).

Commensurate with the Senate Report and Mr. Federico's commentary, we have held that the term 'prior art' refers 'to at least the statutory prior art material named in § 102.' In re Yale, 52 CCPA 1668, 347 F.2d 995, 146 USPQ 400 (1965). See In re Harry, 51 CCPA 1541, 333 F.2d 920, 142 USPQ 164 (1964).

In Hazlittine, the court stated that earlier-filed applications for patents of another describing, although not necessarily claiming, the invention claimed in a later filed application, are prior art under § 102(e) and are available [**16] for consideration in support of a § 103 obviousness rejection of the later-filed application. See In re Bowers, 53 CCPA 1590, 359 F.2d 886, 149 USPQ 570 (1966). And, for purposes of both § 102 and § 103 analysis, they are prior art as of their filing dates."

After considering the above, petitioner may wish to note that the *Wertheim* case involved a rejection specifically phrased as being a rejection under §§ 102(e)/103, for example at 209 U.S.P.Q. 557 wherein the Court stated:

"After considering four motions by Pfluger, the Primary Examiner moved *sua sponte* to dissolve the interference and granted his own motion. In support of his decision, he stated that the claims copied by Wertheim were unpatentable under 35 USC 102(e) and/or 35 USC 103..."

and again at page 560 wherein the Court stated:

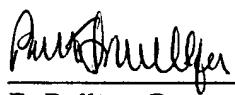
"The §§ 102(e)/103 rejection, thus, is one utilized where § 102(e) alone may fail because not every material limitation of the claimed invention is disclosed in the reference. That reference, referred to as 'prior art' in § 103, may be combined with another to support an obviousness rejection. See In re Caveney, 55 CCPA 721, 386 F.2d 917, 155 USPQ 681 (1967)."

On the other hand, the petitioner should take note of the fact that in the present application, the examiner did not make a rejection under §§ 102(e)/103 in either the first action or the final action.

The examiner made only a Section 103(a) obviousness rejection in each action, and exactly the same rejection in each action. In answer to petitioner's traverse of the first action rejection, the examiner simply informed petitioner of the hornbook principle that the Bailey patent qualified as prior art notwithstanding petitioner's reliance on petitioner's provisional application, because the Bailey patent satisfied the language of 35 USC 102(e), which forms part of the "definition" of the term "prior art". In doing so, the examiner did not apply the Bailey patent in any Section 102 rejection, or make a premature final rejection.

The request for reconsideration has been granted to the extent that the Decision on Petition dated June 12, 2000 has been reconsidered in light of the request, but is denied with respect to granting any of the relief requested therein.

RECONSIDERATION DENIED.

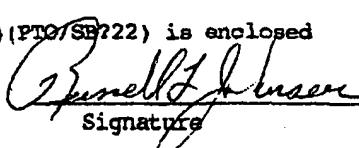
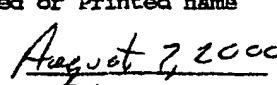

E. Rollins-Cross, Director, Patent
Examining Groups 3710 and 3720

Russell L. Johnson
P.O. Box 161
Weyauwega, WI 54983



PTO/SB/31 (12-97)

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NOTICE OF APPEAL FROM THE EXAMINER TO THE BOARD OF PATENT APPEALS AND INTERFERENCES		Docket Number (Optional)
EXHIBIT 2 M	In re Application of Mark Rasper	
	Application Number 09/222,282	Filed 12/29/99
	For KNIFE INDEXING APPARATUS	
	Group Art Unit 3724	Examiner K. TRAN
Applicant hereby appeals to the Board of Appeals and Interferences from the decision of the examiner dated, <u>05/09/00</u> , rejecting the following claims: <u>1</u>		
The fee for this Notice of Appeal is (37 CFR 1.17(b))		<u>\$ 300.00</u>
<input checked="" type="checkbox"/>	Applicant is a small entity under 37 CFR 1.9 and 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is	<u>\$ 150.00</u>
A statement of small entity status under 37 CFR 1.27:		
<input type="checkbox"/>	is enclosed	
<input checked="" type="checkbox"/>	has already been filed in this application	
<input checked="" type="checkbox"/>	A check in the amount of the fee is enclosed	
<input type="checkbox"/>	The Commissioner is hereby authorized to charge fees in this application to a Deposit Account. I have enclosed a duplicate copy of this sheet.	
<input type="checkbox"/>	The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. <u> </u> . I have enclosed a duplicate copy of this sheet.	
<input type="checkbox"/>	A petition for an extension of time under 37 CFR 1.136(a)(PTO/SB/22) is enclosed	
I am the <input type="checkbox"/> applicant <input type="checkbox"/> assignee of record of the entire interest <input checked="" type="checkbox"/> attorney or agent of record attorney or agent acting under 37 CFR 1.34(a) Registration number if acting under 37 CFR 1.34(a) <u> </u>		
 RUSSELL L. JOHNSON Typed or Printed name		
 Date		

Burden hour Statement: This form is estimated to take 0.2 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, Patent and Trademark Office, Washington DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington DC 20231

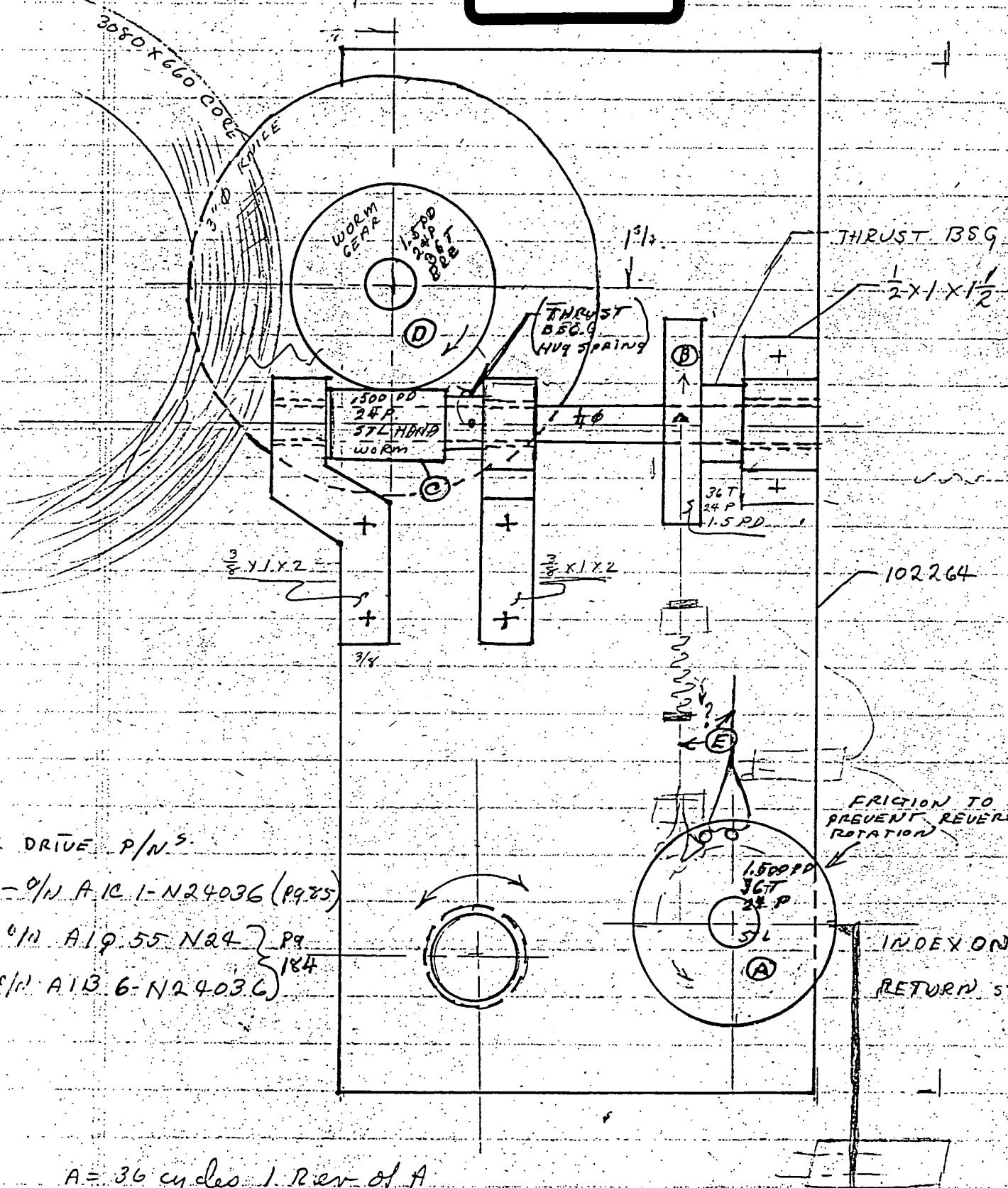
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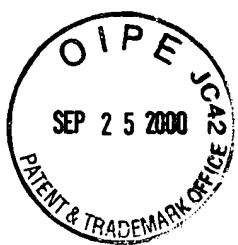
INDEXABLE KNIFE

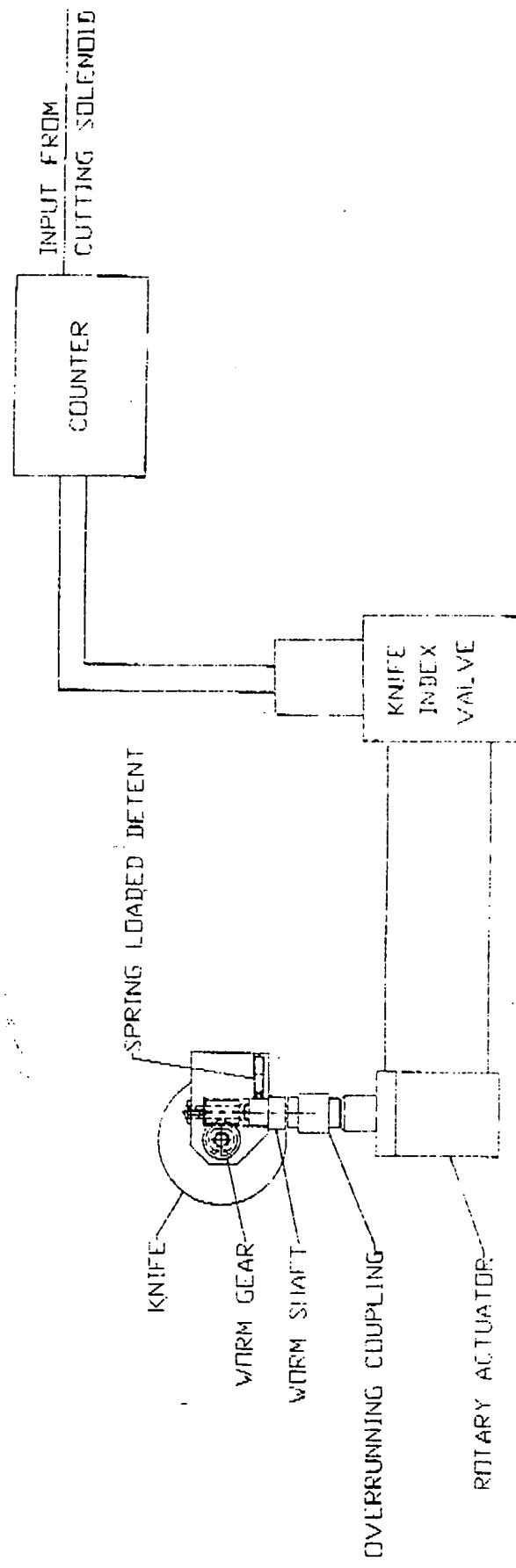
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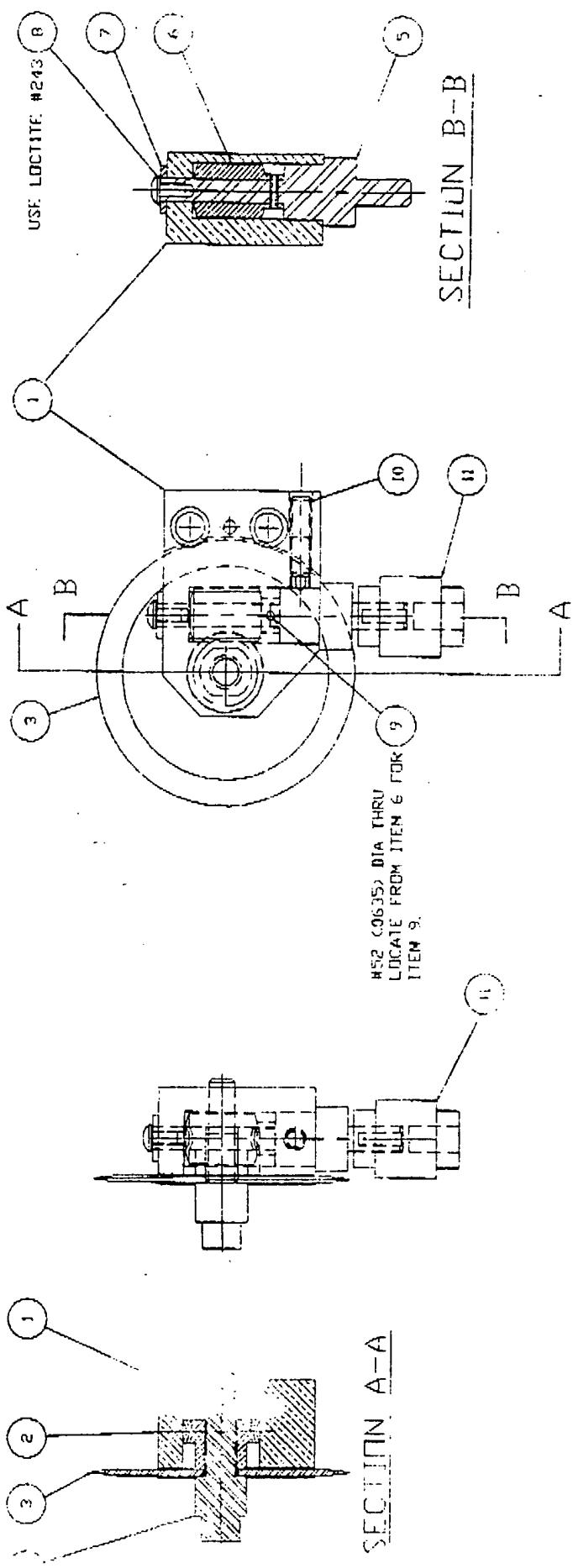
Automatic knife indexer order of events

1. Counter increments for each cut knife makes.
2. When count is reached, output is sent to cause actuator to rotate overrunning coupling and worm shaft 30° .
3. Worm causes worm gear and attached knife to rotate 9° .
4. Worm shaft engages spring loaded detent to locate position of shaft.
5. Actuator reverses to return to starting position.
6. Counter resets to zero to begin next counting cycle.





ITEM	PART NO/UG	LOC	DESCRIPTION	QTY
1	125919	D	HSG/AUTO BLADE INDEX	1
2	125921	A	GEAR, VERNAL AUTO BLADE INDEX	1
3	126072	A	KNIFE, 2-1/2	1
4	125722	A	SHAFT KNIFE HSG/AUTO BLADE INDEX	1
5	125920	A	SHAFT, VERNAL AUTO BLADE INDEX	1
6	125997	A	WORM, STL, 32DP, HARDENED	1
7	101646		VASHER, FLAT, SAE 3/16	1
8	101628		SCREW, CHRD, HDG, STL, 6-32 X 1/4	1
9	126402		PIEROLI, 7/16 X .375	1
10	125903		PLUNGER SPRING, 10-32, LIGHT	1
11	126403	A	CPLG ACT, OVERRUNNING	1



ASSY/AUTO BLADE INDEXING
Customer

Appleton
PRODUCTIVE SOLUTIONS, INC.

R.V.	CHANGE	DATE	BY	C.W.	DATE	6/6/97	04 MR	104 MR	CH MR	P.DT	25894	P.DT SCALE	844 1/2 - 694 3
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Claim 1

An indexing means for a non-rotating circular core cutting knife comprising;

- a) a circular knife defining a central orifice and a positional index adjacent to the central orifice,
- b) a knife mounting mandrel sized to pass through and closely fit the central orifice,
- c) an positional index engaging means secured to the mandrel,
- d) a means for securing the knife in place on the mandrel,
- e) a worm gear secured to the mandrel,
- f) a worm shaft having as a part thereof a worm and the worm is operably engaged with the worm gear,
- g) an overrunning coupling operably secured to the worm shaft so that the coupling in an engaged portion of a cycle rotates the knife in the direction of rotation of a core being cut.
- h) a means for counting cutting cycles of the knife and a means for counting indexing cycles of the indexing means,
- i) a means for activating the knife indexing means when a preset number of cutting cycles has been completed and a means for terminating cutting operations when a predetermined number of indexing cycles has been completed and a predetermined number of cutting cycles has been comple

United States Patent [19]

Bailey

US005761976A

[11] Patent Number: 5,761,976
[45] Date of Patent: Jun. 9, 1998

[54] KNIFE ASSEMBLY

[75] Inventor: Lyle E. Bailey, Green Bay, Wis.

[73] Assignee: Automatic Handling, Inc., Eric Mist

[21] Appl. No. 842,701

[22] Filed: APR. 15, 1997

[51] Int Cl⁶ B23B 5/14; B23B 21/00
[52] U.S. C

[52] U.S. Cl. 82/70.1; 82/100; 83/955
[58] W.I.P. 2

[38] Field of Search 82/86. 70.2. 75.
82/83. 100. 101; 83/955

[56]

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1,504,703	8/1924	Nicholas	82/100 X
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4,693,157	9/1987	Loosser	83/955 X
5,383,380	1/1995	Santoi	82/101 X
5,555,783	9/1996	Pienta	82/101 X

Primary Examiner—A. L. Pins

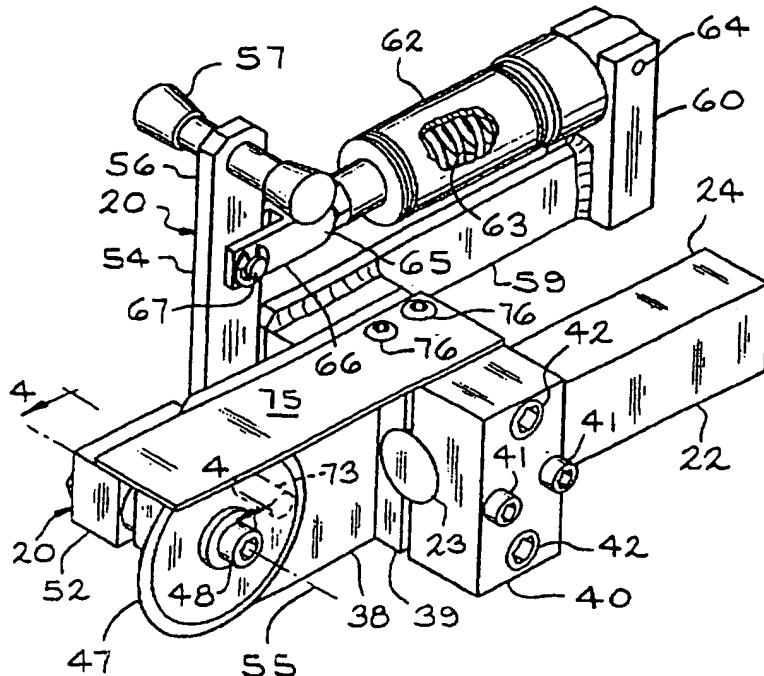
Assistant Examiner—Henry W.H. Tsai

Attn. Atty. W.M. Tamm
Attorney, Agent, or Firm—Ernch, Schaffer, Schaub & Porcello, Co., L.P.A.

[57] ABSTRACT

The present invention is directed to a knife assembly which is used to cut a rotating tube, such as a paper or plastic tube. The circular knife remains stationary during the cutting. After a number of cuts, the knife becomes dull. The present knife assembly rotates the circular blade or knife through a predetermined angle which results in an incremental movement of the circumference or cutting edge of the knife. A shaft has a first end which mounts the circular knife and a second end connected to a one-way clutch. An arm extends from the one-way clutch. Movement of the arm in a first direction rotates the shaft and moves the cutting surface of the knife. The arm is returned in an opposite direction. During this return arm movement the shaft and knife remain stationary. The assembly is then ready for the next cycle.

13 Claims, 4 Drawing Sheets



EXHIBIT

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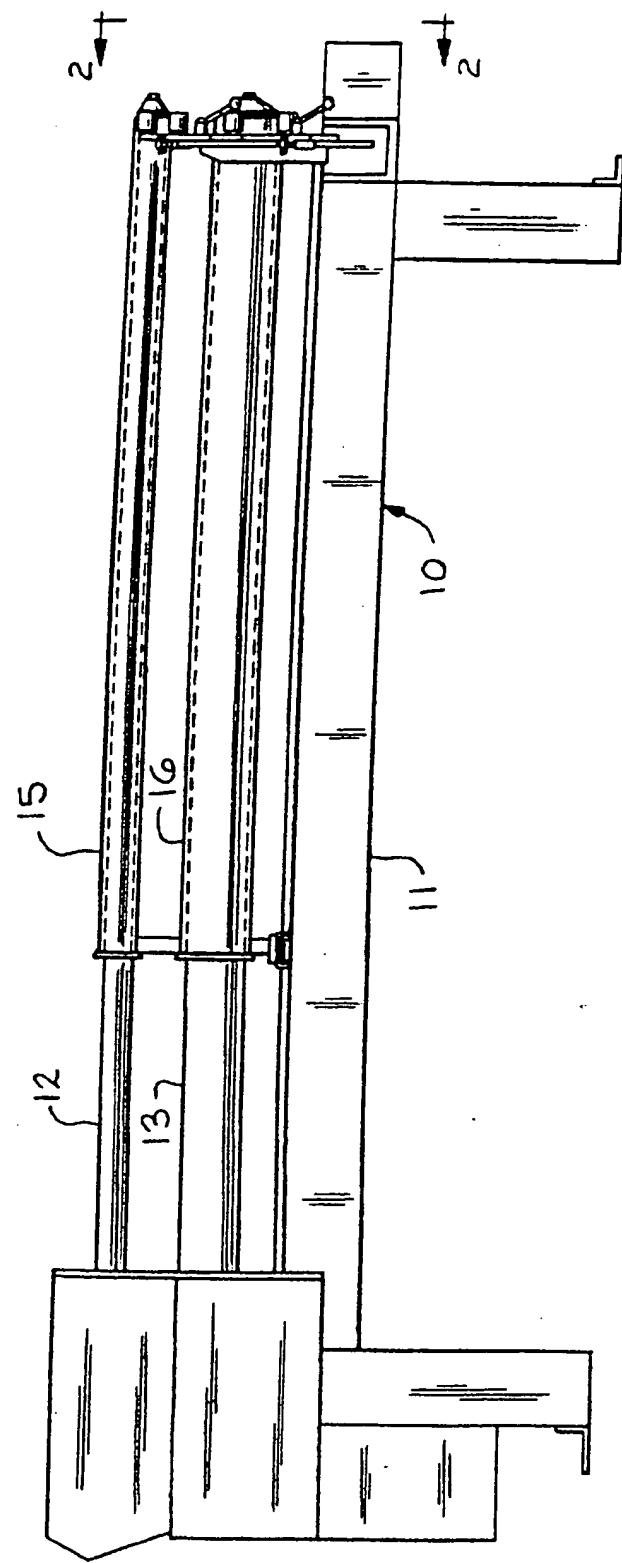


FIG. 1

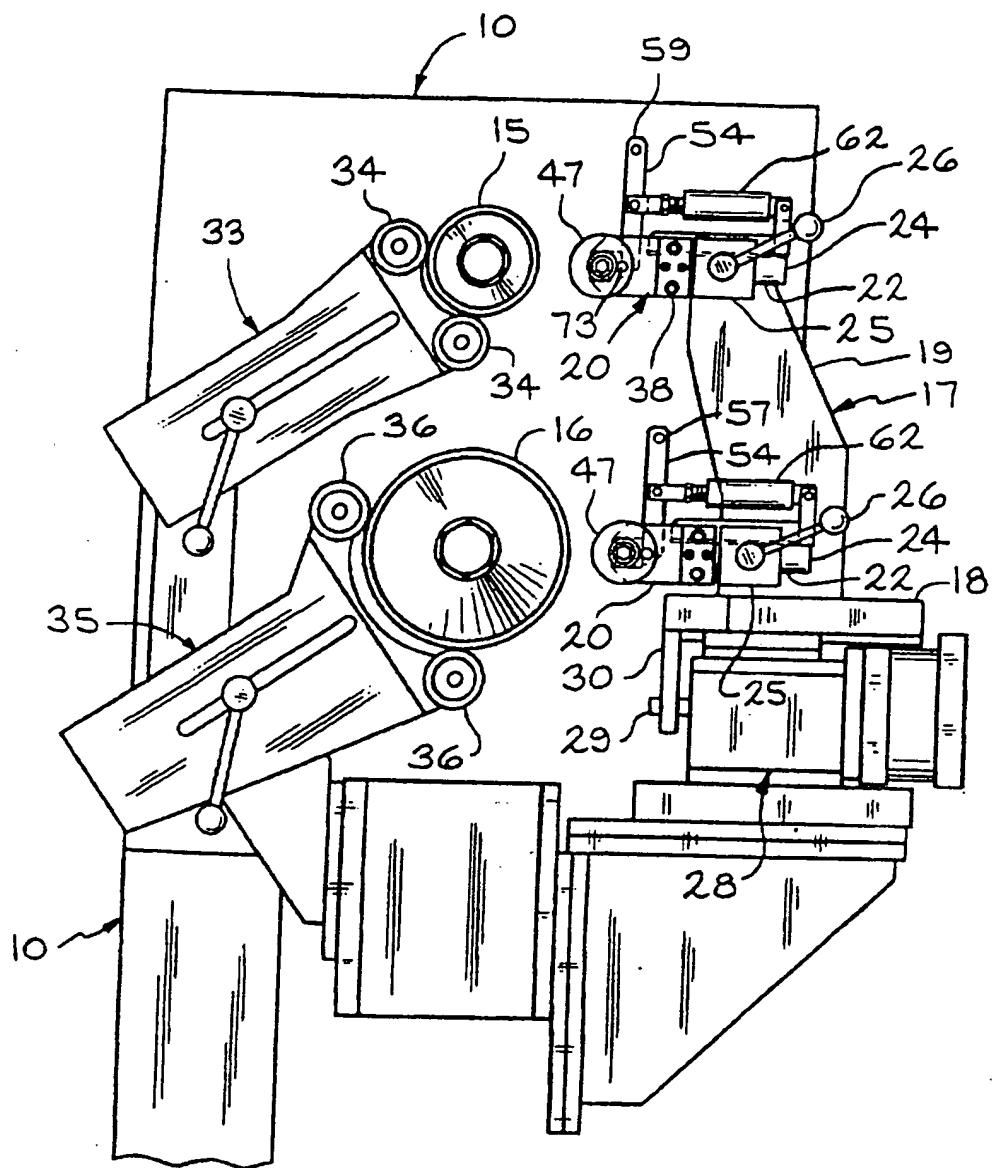


FIG. 2

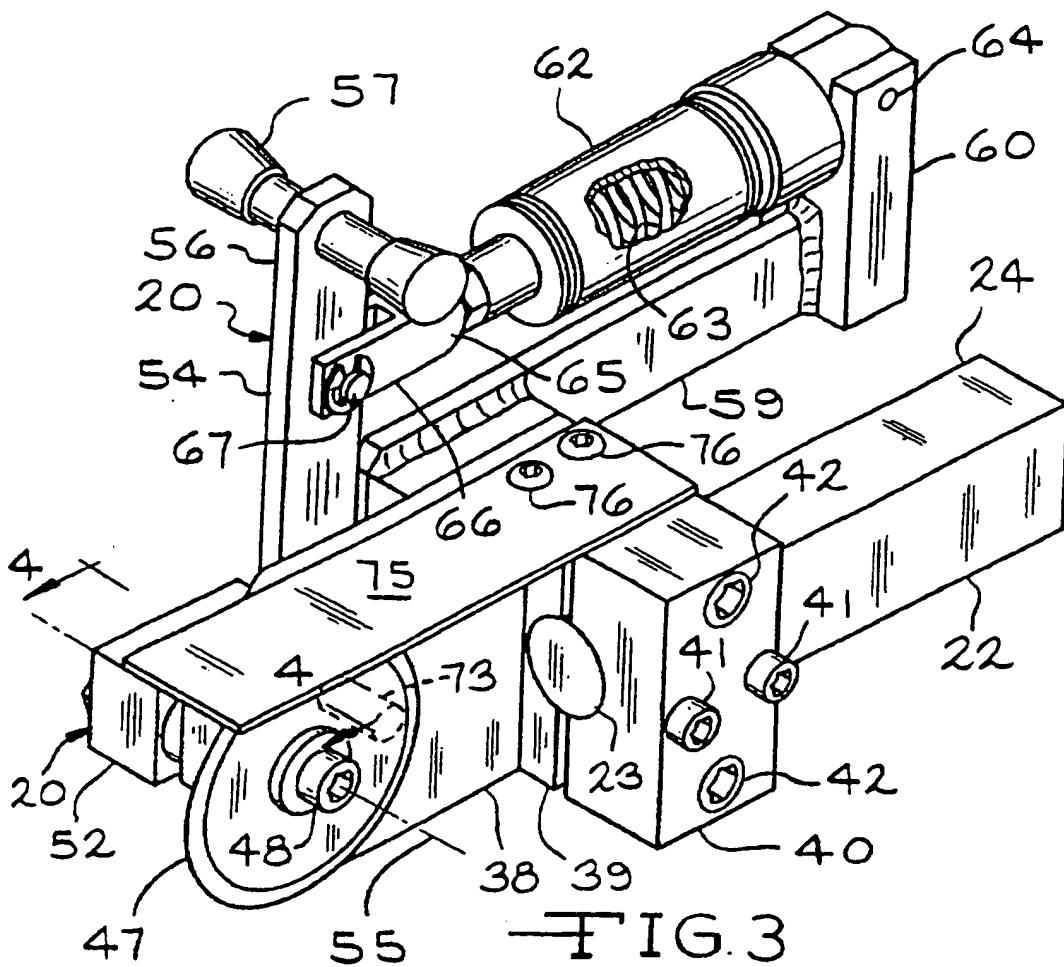


FIG. 3

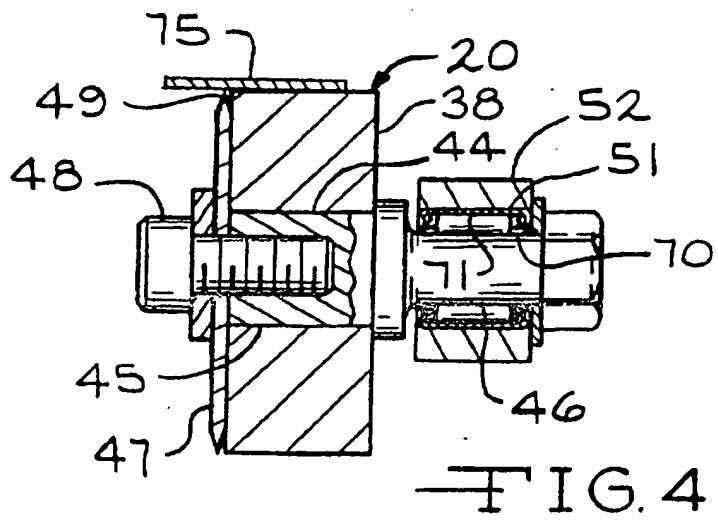
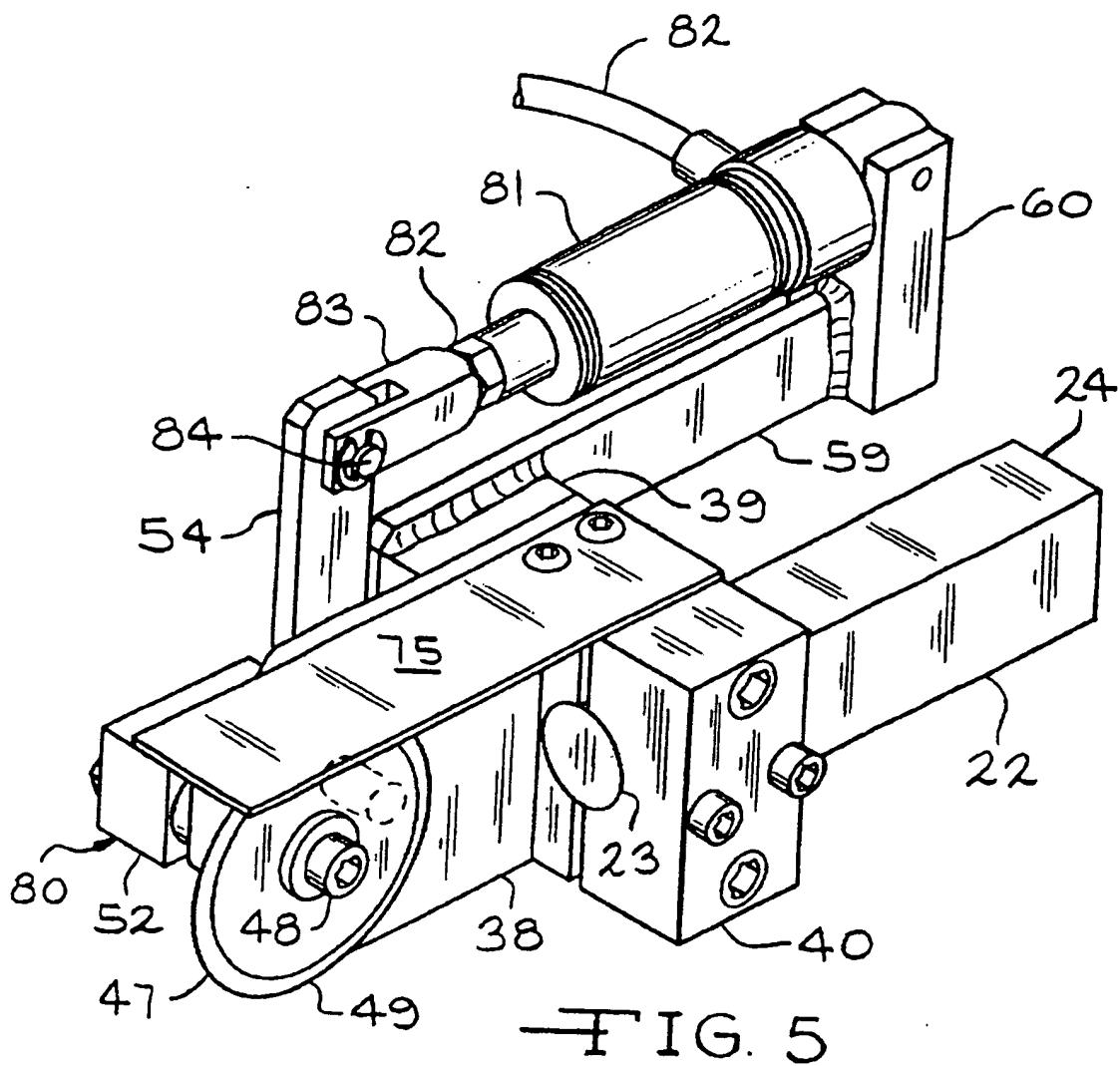


FIG. 4



KNIFE ASSEMBLY

BACKGROUND OF THE INVENTION

The present invention is directed to a knife assembly and more specifically to an automatic indexing knife assembly for use with machines such as core cutting machines which are used to cut cores from cylindrical tubes of stock material. A prior art core cutting machine is shown in U.S. Pat. No. 5,555,783.

In prior art core cutting machines, a tube such as a cardboard or plastic tube is positioned on a mandrel. The mandrel is rotated and a knife assembly is moved against the cylindrical tube to cut a core of a predetermined width. The circular knife of the knife assembly remains stationary during the cutting operation.

In prior art knife assemblies, when the knife became dull after numerous cuts, the machine would be stopped and the knife assembly adjusted manually to place a new portion of the cutting edge circumference into position for contacting subsequent tubes during cutting.

The primary object of the present invention is to provide an improved knife assembly which indexes or rotates the knife blade to a new cutting surface.

SUMMARY OF THE INVENTION

The present invention is directed to an automatically indexing knife assembly which is used with a core cutting machine to cut a rotating tube, such as a paper or plastic tube.

The knife assembly of the invention indexes the circular blade or knife through a predetermined angle. The knife assembly includes a shaft which mounts a circular knife blade at one end and has a second end connected to a one-way clutch. An arm extends from and is operatively connected to the one-way clutch. Movement of the arm in a first direction rotates the shaft and moves the cutting surface of the knife. The arm is then returned in an opposite direction. During this return, the knife remains stationary. The knife assembly, according to the present invention, is then ready for the next cycle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a elevational view showing a typical core cutting machine;

FIG. 2 is an end view taken along the line 2—2 of FIG. 1, shown on an enlarged scale, and showing two knife assemblies, according to the present invention;

FIG. 3 is a perspective view of the knife assembly, according to the present invention, shown on an enlarged scale;

FIG. 4 is a fragmentary cross-sectional view taken along the line 4—4 of FIG. 3 and shown on an enlarged scale; and

FIG. 5 is a perspective view of another embodiment of a knife assembly, according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A typical core cutting machine is generally indicated in FIGS. 1 and 2 by the reference number 10. The core cutting machine 10 includes a base 11, an upper mandrel 12 and a lower mandrel 13. Core tubes, such as cardboard cylinders 15 and 16, are mounted on the mandrels 12 and 13, respectively, during the cutting operation. Details of the core cutting machine 10 are given in U.S. Pat. No. 5,555,783.

which is incorporated herein by reference. The core cutting machine 10 rotates the tubes 15 and 16 during the cutting operation. Referring to FIG. 2, the core cutting machine 10 includes a cutter assembly 17 having a moveable platform 18, an upwardly extending arm 19 and a pair of knife assemblies 20, according to the present invention. The knife assemblies 20 are connected by a support 22 having a circular front end 23 and a rectangular rear end 24. The cutter assembly 17 of the core cutting machine 10 includes holders 25 mounted on the arm 19. The holders 25 receive the rear ends 24 of the supports 22. The holders 25 include handle assemblies 26 which releasably secure the supports 22 to the holders 25.

A cylinder 28 having a rod 29 is connected to the moveable platform 18 by a support member 30. Actuation of the cylinder 28 and its rod 29 provide the primary adjustment of the knife assemblies 20 toward and away from the core tubes 15 and 16.

The core cutting machine 10 includes an upper support roller assembly 33 having rollers 34 which are positioned adjacent the core tube 15. Similarly, the core cutting machine 10 includes a lower support roller assembly 35 which includes rollers 36 positioned adjacent the core tube 16.

When the knife assemblies 20 are located in a cutting position adjacent the tubes 15 and 16, the support roller assemblies 33 and 35 provide the counter active forces to resist deflection of the mandrels 12 and 13 during the cutting operation.

Referring to FIGS. 3 and 4, the knife assembly 20, according to the present invention, includes a mounting member 38 having a cross leg 39 and an end cap 40. The end cap 40 and the cross leg 39 are secured to the front end 23 of the support 22 by screws 41. Screws 42 secure the end cap 40 to the cross leg 39. A shaft 44 having a first end 45 and second end 46 is mounted for rotation by said mounting member 38. A circular knife or blade 47 is fixably mounted to the first end 45 of the shaft 44 by a screw 48. In the present embodiment the knife or blade 47 has a circular outer edge 49 and a two inch diameter. However, the knife blade 47 does not necessarily have to have a circular periphery nor a specific diameter. Referring to FIG. 4, a one-way clutch 51 is mounted on the second end 46 of the shaft 44. In the present embodiment the one-way clutch 51 is a prior art one-way Torrington roller clutch. This type of prior art clutch allows movement of the outer housing in one direction and locks the housing to the shaft when rotated in an opposite direction.

Referring to FIGS. 3 and 4, the one-way clutch 51 is positioned within a clutch block 52. The one-way clutch 51 is operatively connected to an arm 54 which is welded to the clutch block 52 and which extends outwardly from the shaft 44. Referring to FIG. 3, the shaft has an axis of rotation 55. The arm 54 extends perpendicularly to the axis of rotation 55 of the shaft 44. In the present embodiment, the arm 54 has an outer end 56. A handle 57 is mounted adjacent the outer end 56 of the arm 54.

Referring to FIG. 3, a bracket 59 has a generally vertical rear end 60. The bracket 59 is welded to the cross leg 39 of the mounting member 38. A cylinder 62 including a return spring 63 has one end connected by a pin 64 to the vertical rear end 60 of the bracket 59. The cylinder 62 includes a rod 65 which mounts a clevis 66 at its front end. The clevis 66 is pivotally connected to the arm 54 by a pin 67.

Referring to FIG. 4, the one-way clutch 51 includes an inner portion 70 which is fixed to the second end 46 of the

shaft 44 and an outer portion 71 which is operatively connected to the arm 54 through the clutch block 52.

In operation, when the knife or blade 47 becomes dull, the operator manually grasps the handle 57 and moves the outer end 56 of the arm 54 forwardly. The shaft 44 is rotated by the action of the locked up one-way clutch 51. Movement of the arm 54 in the forward or first direction rotates or indexes the shaft through a predetermined angle to rotate the blade a predetermined distance or increment. In the present embodiment, when using a two inch diameter circular knife, the predetermined angle is approximately 7.2° resulting in a blade advancement of $\frac{1}{8}$ inch (0.32 cm.). The specific amount of advancement desired depends on the shape of the blade and also the diameter of the blade together with other variables which include the thickness of the tube being cut and the material which is being cut.

After the blade is rotated the desired amount, which is predetermined by the stroke of the cylinder 62, the operator manually releases the handle 57 and the return spring 63, which is operatively connected to the arm 54 moves the arm rearwardly in a second direction which is opposite to the first direction when the arm 57 is manually pushed forward. At this time, after the cylinder rod 65 is retracted, the handle 57 and cylinder 62 are in position for another cycle. During the rearward movement of the arm 54, the inner portion 70 and the outer portion 71 of the one-way clutch are disconnected from one another and the shaft 44 and blade 47 remain stationary.

In the present embodiment, referring to FIG. 3, a magnet 73 is mounted by the mounting member 38 adjacent the knife or blade 47. When the arm 54 is moved in the rearward or second direction, the magnetic forces of the magnet 73 urge the blade 47 to remain static. In another embodiment, not shown, a second one-way clutch is mounted on the end of the shaft which mounts the blade. This one-way clutch operates in the reverse manner of the one-way drive clutch 51. The second one-way clutch insures that the blade 47 does not rotate from its desired new cutting position during the rearward movement of the arm 54 and the handle 57.

Referring to FIG. 3, a horizontal shield 75 is mounted over the circular knife 47. The shield is connected to the cross leg 39 of the mounting member 38 by screws 76.

Referring to FIG. 5, another embodiment of a knife assembly, according to the present invention is generally indicated by the reference number 80. Common components of the knife assembly 80 are given the same reference numerals as the above-described knife assembly 20. The main difference between the two embodiments is that the knife assembly 80 is an automatic indexing unit, rather than a manual indexing unit. A cylinder 81 which is a spring returned air cylinder is mounted by the vertical rear end 60 of the bracket 59. An air hose 82 is connected to the cylinder 81. The cylinder 81 includes a rod 82 which mounts a clevis 83 at its outer end. The clevis 83 is pivotally mounted to the arm 54 by a pin 84.

During operation of the knife assembly 80, according to the present invention, a programmable logic control actuates the cylinder 81 after a predetermined number of cuts. The rod 82 is extended and the arm 54 moved forward in the first direction. In a manner similar to the operation of the knife assembly 20, this movement acting through the one-way roller clutch 51 rotates the shaft 44 and the knife or blade 47 which is fixably mounted on the first end of the shaft 44. This rotation moves or indexes the knife 47 through a predetermined angle resulting in a predetermined incremental movement of the knife 47. The air activated spring

cylinder 81 then urges the lever arm 54 in a rearward or second direction. At this time, the knife assembly 80 is moved back to its home position, as indicated in FIG. 5 awaiting the beginning of another cycle.

Many revisions may be made to the above-described embodiments without departing from the scope of the present invention or from the following claims.

I claim:

1. A knife assembly comprising, a mounting member, a shaft having first and second ends mounted for rotation by said mounting member, a circular knife fixably mounted adjacent said first end of said shaft, a one-way clutch mounted adjacent said second end of said shaft, an arm operatively connected to said one-way clutch and extending outwardly from said shaft, whereby movement of said arm in a first direction rotates said shaft and said knife a predetermined increment, a spring operatively connected to said arm for moving said arm in a second direction opposite to said first direction and a magnet mounted adjacent said knife, wherein when said arm is moved in such second direction, the magnetic forces of said magnet urge said knife to remain static.
2. A knife assembly, according to claim 1, wherein a cylinder is operatively connected to said mounting member, said spring being positioned within said cylinder, said cylinder being operatively connected to said arm.
3. A knife assembly, according to claim 1, wherein said arm has an outer end and a handle mounted adjacent said outer end of said arm.
4. A knife assembly, according to claim 1, wherein said one-way clutch includes an inner portion mounted on said shaft and an outer portion surrounding said inner portion, said arm being operatively connected to said outer portion.
5. A knife assembly, according to claim 1, including an air cylinder operatively connected between said arm and said mounting member, whereby actuation of said air cylinder moves said arm in such first direction.
6. A knife assembly, according to claim 5, including a return spring mounted within said cylinder to move said arm in a second direction opposite to said first direction.
7. A knife assembly comprising a mounting member, a shaft having first and second ends mounted for rotation by said mounting member, a circular knife fixably mounted on said first end of said shaft, a one-way roller clutch mounted on said second end of said shaft, a lever arm having an inner end operatively connected to said one-way roller clutch and an outer end, said lever arm extending perpendicular to said shaft, a said one-way roller clutch including an inner portion mounted on second end of said shaft and an outer portion surrounding said inner portion, said lever arm being operatively connected to said outer portion of said one-way roller clutch, and a fluid cylinder operatively connected to said lever arm, wherein movement of said lever arm in a first direction rotates said shaft a predetermined increment, said fluid cylinder including return means for urging said lever arm in a second direction opposite to said first direction.
8. A knife assembly, according to claim 7, including a horizontal shield mounted over said circular knife.
9. A knife assembly, according to claim 7, wherein said cylinder includes a return spring urging said lever arm in a second direction opposite to said first direction.
10. A knife assembly, according to claim 9, wherein said fluid cylinder is an air cylinder and actuation of said air cylinder moves said lever arm in said first direction.
11. A knife assembly comprising, a mounting member, a shaft having first and second ends mounted for rotation by said mounting member, a circular knife fixably mounted

adjacent said first end of said shaft, a one-way clutch mounted adjacent said second end of said shaft, an arm operatively connected to said one-way clutch and extending outwardly from said shaft, whereby movement of said arm in a first direction rotates said shaft and said knife a predetermined increment, an air cylinder operatively connected between said arm and said mounting member, whereby actuation of said cylinder moves said arm in such first direction and a return spring mounted within said cylinder to move said arm in a second direction opposite to 10 said first direction.

12. A knife assembly comprising a mounting member, a shaft having first and second ends mounted for rotation by said mounting member, a circular knife fixably mounted on said first end of said shaft, a one-way roller clutch mounted 15 on said second end of said shaft, a lever arm having an inner

end operatively connected to said one-way roller clutch and an outer end, said lever arm extending perpendicular to said shaft, and a cylinder operatively connected to said lever arm, wherein movement of said lever arm in a first direction rotates said shaft a predetermined increment, said cylinder including a return spring urging said lever arm in a second direction opposite to said first direction, wherein said cylinder is an air cylinder and actuation of said air cylinder moves said lever arm in said first direction.

13. A knife assembly, according to claim 12, wherein said one-way roller clutch includes an inner portion mounted on second end of said shaft and an outer portion surrounding said inner portion, said lever arm being operatively connected to said outer portion of said one-way roller clutch.

* * * *

United States Patent [19]

Cavalli

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[45] Date of Patent: Mar. 25, 1986

[54] AUTOMATIC DEVICE FOR ADVANCEMENT
OF REVOLVING MECHANICAL ORGANS

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[51] Int. Cl.⁴ F16H 35/00

[52] U.S. Cl. 74/841; 408/80;
408/82; 408/137; 409/179

[58] Field of Search 74/841; 408/79, 80,
408/81, 82, 129, 137, 146; 409/175, 179, 185;
30/94, 96

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Primary Examiner—Larry L. Schwartz

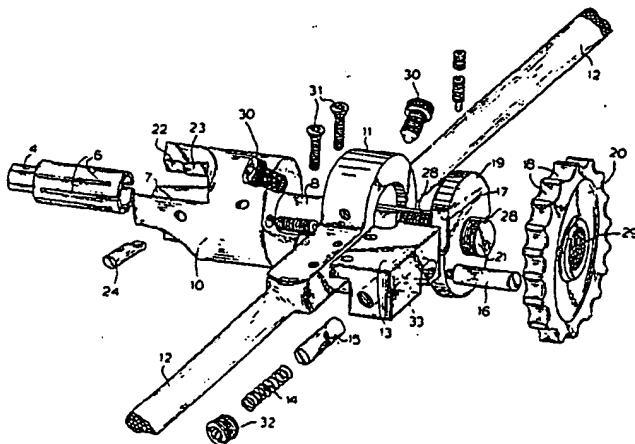
Assistant Examiner—David W. Westphal

Attorney, Agent, or Firm—Collard, Roe & Galgano

[57] ABSTRACT

A device for automatic advance of a rotating tool towards a workpiece, which includes a rotating tool holder for holding a cutting tool for operation on the workpiece. A gear wheel bears against the rotating tool holder which forces it toward the workpiece. A holder is provided to secure the gear wheel with respect to the workpiece. A device associated with the rotating tool holder engages the gear wheel and rotates it as the tool holder rotates. Associated with the holder and the gear wheel is a mechanism for advancing the gear wheel towards the workpiece as the gear wheel rotates. A stop motion apparatus associated with the gear wheel and the rotating tool holder is included for stopping the rotational movement of the gear wheel. The stop motion apparatus consists of a non-rotatable cam which operates on the cam follower to disengage it from the gear wheel, stopping the rotating movement thereof during a segment of the rotation of the tool holder.

5 Claims, 5 Drawing Figures



EXHIBIT

38

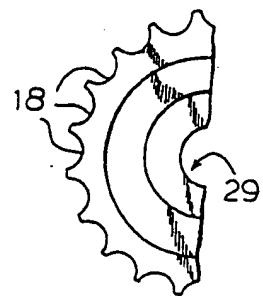


FIG.4

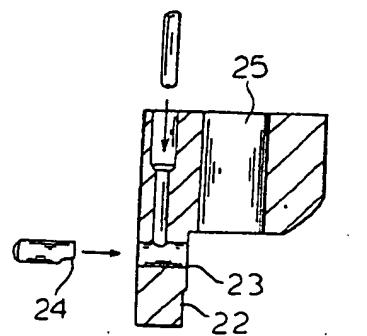


FIG.2

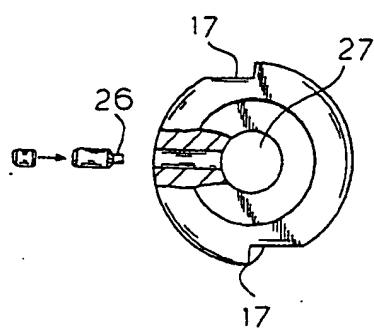
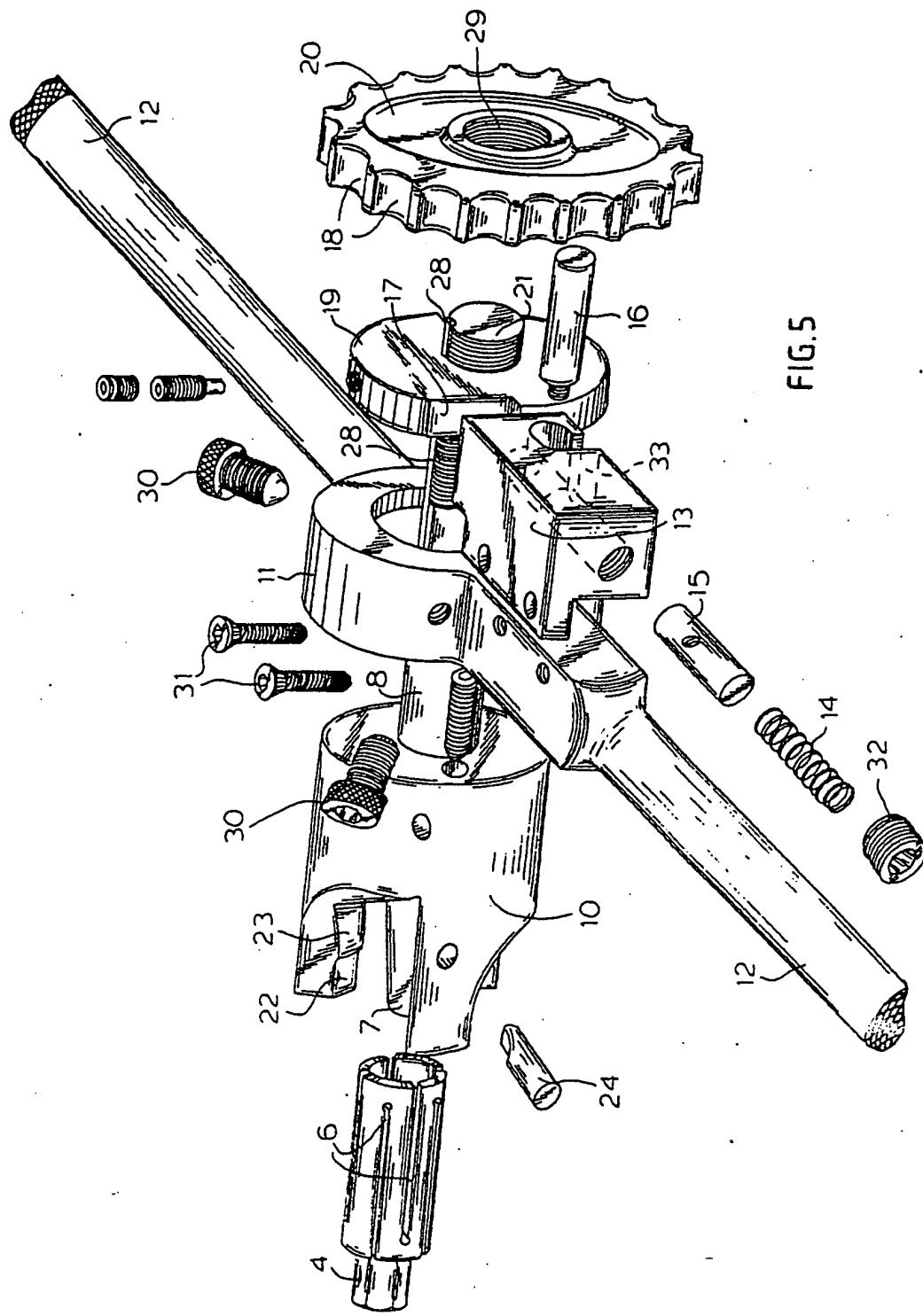


FIG.3



AUTOMATIC DEVICE FOR ADVANCEMENT OF REVOLVING MECHANICAL ORGANS

This invention relates to an automatic device for advancement of revolving mechanical organs. More particularly, it relates to an automatic device consisting of an advancement mechanism which transforms the motion of a revolving body or tool into a linear advancement motion of the same.

BACKGROUND OF THE INVENTION

A variety of machine tools such as milling machines, drills, tap wrenches, diestocks, and other manual tools, require a revolving cutting motion in combination with an advancement motion. Although the present invention relates to an automatic device for linear advancement which may be applied to any kind of mechanical component that has a revolving motion, for the sake of clarity and simplicity, the device will be described herein as applied to a diestock or tool holder. A diestock requires the operator to provide rotary motion, and also advancement motion. As the tool is operated by hand, it is difficult for the operator to attain the uniformity of pressure and advancement, needed to obtain a cutting surface which is perfectly perpendicular to the axis of rotation of the piece being machined. Therefore, use of a diestock on work involving greater precision than that provided manually by the operator, has required that an automatic advancement device which makes use of a rotary cutting motion supplied manually by the operator, be attached to and used with the diestock.

Accordingly, it is an object of the present invention to provide an automatic device for advancement of revolving mechanical elements, such as cutting tools and the like, which supplies a uniform precision advancement, driven only by rotary motion.

It is also an object of the invention to provide such an automatic device which is of simple and economical construction, easy to use and install, and which is reliable in operation.

SUMMARY OF THE INVENTION

Certain of the foregoing and related objects are readily attained in a device for automatically advancing a rotating tool, with the device including a cutting tool and a rotating tool holder, for holding the cutting tool during operation on a workpiece. A gear wheel is secured in a fixed position with respect to the workpiece and bears against the rotating tool holder, forcing the tool holder against the workpiece. The rotating tool holder includes means for engaging the gear wheel and rotating it, as the tool holder is rotated. A mechanism, such as a screw thread, is provided for advancing the gear wheel towards the workpiece, as the gear wheel is rotated. In addition, a non-rotatable cam operates on the gear engaging means associated with the rotating tool holder to disengage the gear engaging means from the gear wheel, thereby stopping the rotating movement of the gear wheel, during a segment of rotation of the tool holder.

Preferably, the gear engaging means includes a latch which is radially moveable with respect to the gear wheel, for engaging and disengaging it. The latch is integral with a radially moveable cam follower engaged with the cam, the latch engaging with and disengaging

from the gear wheel, as the cam follower is moved radially by the cam.

It is also desirable that the cam follower and the integral latch be carried by and rotate with the tool holder. In a preferred embodiment of the invention, biasing means are provided for biasing the cam follower towards the cam, and stop means are provided for the latch to hold it from engaging the gear wheel.

Most desirably, the gear wheel is secured into a fixed position with respect to the workpiece by a collet securing the workpiece to an axial pin of the rotating tool. The tool holder is adapted to rotate on and move axially along the pin. The gear wheel and the pin are threadably engaged with the cam being engaged to the pin by means of a longitudinal groove along the pin engaged with a projection on the cam.

As previously stated, the present invention is described herein in an embodiment suitable for use with a diestock. The diestock consists of a tool holder having two maneuvering arms. The cutting tool itself is cylindrical and has internal cutting edges that operate on the outside of the tube or workpiece, which is being machined. The cutting tool is secured into the holder by screws. The tool's axial datum is obtained by sliding the tool onto a pin, which is coaxial with the tube, in such a way that the pin acts as a centering shaft for the tool itself. The invention consists essentially of a gear wheel screwed onto the extreme rear of the pin and a cam disposed in front of the wheel (or stop motion means). A spring latch is fixed to one of the arms and consists of two ratchet pins which are disposed at right angles, and periodically engage the cam and gear wheel as the diestock is turned during machining. The ratchet disposed radially to the cam transmits the revolving motion of the diestock to the gear wheel only when it is engaged into the grooves of the cam. When the radially disposed ratchet is so engaged, it enables the other ratchet disposed perpendicular to it to engage the teeth of the gear wheel causing it to turn incrementally. As the gear wheel turns, it advances via screw threads on the pin and is forced against the cam, which is mounted on the pin, so that it can slide on the pin, but cannot rotate. The cam is thereby forced against the diestock, causing the cutting tool to advance incrementally further into the workpiece. As the number and shape of the cam grooves determine the ratio between rotations and advancement, it is possible to obtain any reduction or advancement ratio desired.

Other objects and features of the present invention will become apparent from the following detailed description considered in connection with the accompanying drawings, which discloses but a single embodiment of the invention. It is to be understood that the drawings are to be used for the purpose of illustration only, and not as a definition of the limits of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein similar reference characters denote similar elements throughout the several views:

FIG. 1 is a side elevational view partly in cross-section of the automatic device for advancement of revolving mechanical organs, embodying the present invention;

FIG. 2 is a fragmentarily illustrated transverse sectional view of the cutting tool;

FIG. 3 is a top elevational view partly in cross-section of the cam;

FIG. 4 is a fragmentarily illustrated top elevational view of the gear wheel; and
FIG. 5 is an exploded perspective view of the present invention as used with a diestock.

DETAILED DESCRIPTION OF THE DRAWINGS

Turning now in detail to the appended drawings, therein is illustrated a novel automatic device for advancement of revolving mechanical elements. As clearly seen in FIG. 1, a clamping vice 2 is clamped around the outside of the tube or workpiece 1 being machined. Disposed adjacent to vice 2 but inside of tube 1 are maneuvering spanner 3 and a maneuvering nut 4, which, through the axial displacement in both directions of the washer 5, controls the expansion and contraction of the collet 6. Collet 6 is fitted onto the tapering part 7 of the locating pin 8 making it possible to axially lock pin 8 into tube 1. The forward part of the tube shown at 9 has already been machined by tool 10 fitted onto the modified diestock 11. Maneuvering arms 12 are turned manually by the operator who supplies the rotary motion. Elastic latch 13, together with the action of spring 14, maintains the engagement of ratchets or cam follower 15 and latch 16 into the respective grooves 17 and 18. Groove 17 is located on cam 19 which is mounted on pin 8 so that the cam can slide axially along pin 8 without being able to rotate. This mounting is achieved by having pin 8 pass through guide bore 27 of cam 19 (FIG. 3). Guide projection 26 protrudes into longitudinal groove 28 of pin 8 (FIG. 5), but it does not actually engage or clamp pin 8.

Groove 18 is located on the external circumference of the gear wheel 20 which bears a continuous series of grooves shaped appropriately for the ratchet or latch 16. Gear wheel 20 is screwed onto threaded part 21 of pin 8, and it is therefore forced to advance on its thread during the period in which the ratchet or latch 16 remains engaged on one of its teeth. This occurs twice during each complete turn of the die as gear wheel 20 advances via its threaded engagement to pin 8, it bears against cam 19 which in turn bears against diestock 11. As a result, cutting tool 10 is forced further towards or into the workpiece, as diestock 11 is rotated.

In the embodiment of the invention shown, the cam 45 grooves are arranged at 180 degrees and so that it is only when ratchet or cam follower 15 fully penetrates one of them that ratchet or latch 16 is engaged with the gear wheel. This action brings about an advancement of 1/10 of a millimeter for each complete turn.

As shown in FIG. 2, cutting edges 22 of the milling machine are used for the more superficial machining of the tube. Cutting edges 23 are used for the deeper cycle while cutter 24 is provided for machining the tube's front parting-off section. When assembled, locating pin 8 passes through bore 25 of milling machine or cutter 10.

FIG. 4 shows the threaded coupling bore 29 of gear wheel 20 engaged to the threaded part 21 of locating pin 8.

Turning now to FIG. 5 which shows additional details of the present invention, screws 30 are used to lock milling machine or cutter 10 into diestock 11. Elastic

latch 13 is fastened to an arm 12 of diestock 11 via screws 31. Compression dowel 22 maintains spring 14 within elastic latch 13 and bore 33 is shaped in such a way as to keep the latch disengaged while the equipment is being set up.

Thus, while only one embodiment of the present invention has been shown and described, it is obvious that many changes and modifications may be made thereunto, without departing from the spirit and scope of the invention.

I claim:

1. A device for automatic advance of a rotating tool towards a workpiece, said tool including a cutting tool, comprising:
 - (a) a rotating tool holder for holding said cutting tool for operation on said workpiece;
 - (b) a gear wheel bearing against said rotating tool holder toward said workpiece;
 - (c) holding means secured to said workpiece for holding said gear wheel with respect to said workpiece;
 - (d) means associated with said rotating tool holder for engaging said gear wheel and rotating the same as said tool holder rotates;
 - (e) means associated with said holding means and said gear wheel for advancing said gear wheel towards said workpiece as said gear wheel rotates; and
 - (f) a stop motion means associated with said gear wheel and said rotating tool holder for stopping the rotational movement of said gear wheel, said stop motion means comprising:

a non-rotatable cam which operates on said gear engaging means associated with said rotating tool holder to disengage said gear engaging means from said gear wheel, stopping the rotating movement thereof during a segment of the rotation of said tool holder.

2. The device for automatic advance of a rotating tool as defined in claim 1, wherein said gear engaging means comprises a latch radially movable with respect to said gear wheel for engaging and disengaging from the same, said latch being integral with a radially movable cam follower engaged with said cam, said latch engaging with and disengaging from said gear wheel as said cam follower is moved radially by said cam.

3. The device for automatic advance of a rotating tool as defined in claim 2, wherein said cam follower and said integral latch are carried by said tool holder and rotate therewith.

4. The device for automatic advance of a rotating tool as defined in claim 3, which further comprises biasing means for biasing said cam follower towards said cam, and stop means for said latch to hold said latch from engagement with said gear wheel.

5. The device for automatic advance of a rotating tool as defined in claim 1, wherein said holding means comprises a collet securing said workpiece to an axial pin of said rotating tool, said tool holder being adapted to rotate on and move axially along said pin, said gear wheel and said pin being threadably engaged, and said 60 cam being engaged with said pin by means of a longitudinal groove along said pin engaged with a projection on said cam.

* * * *